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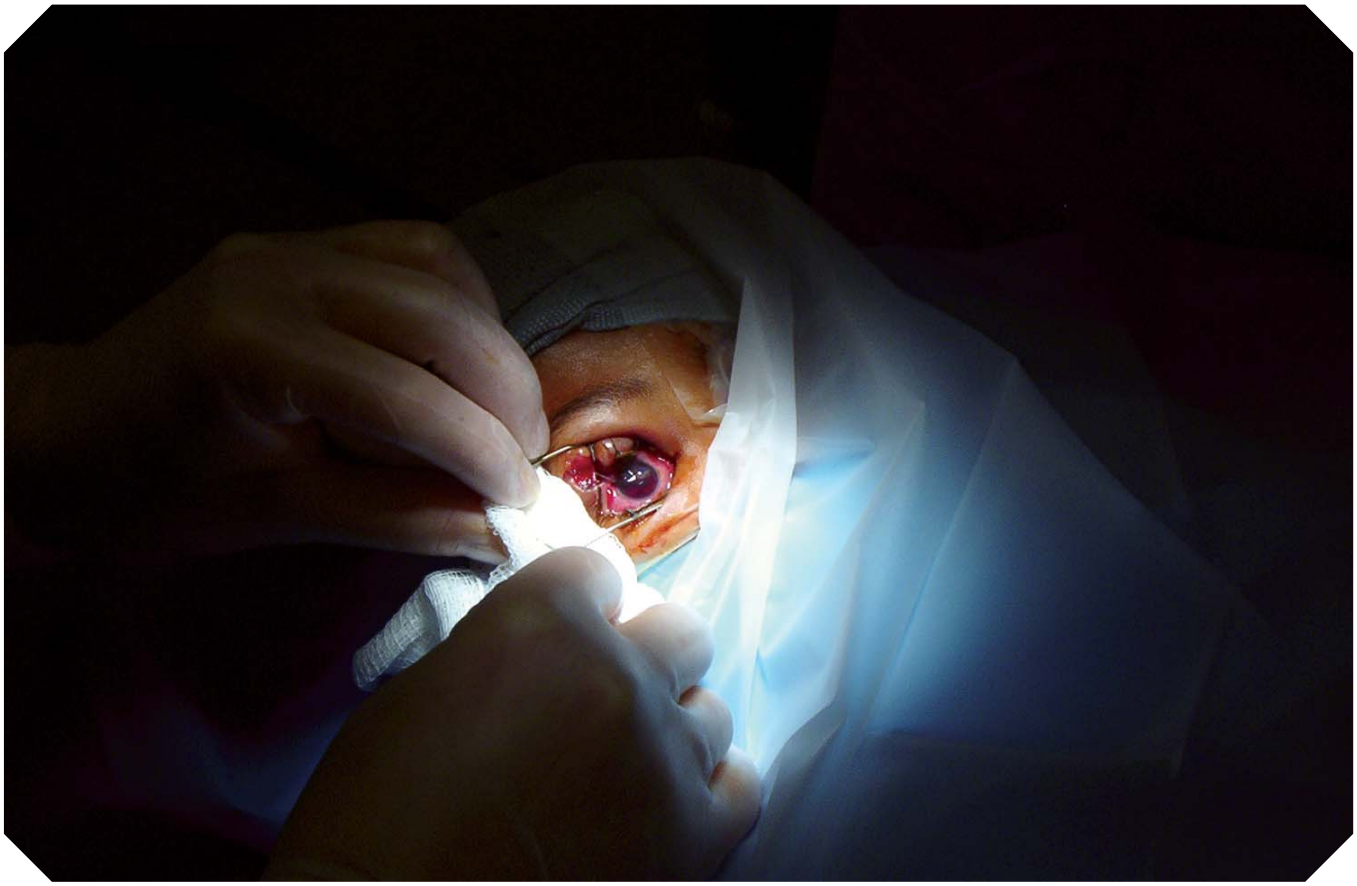

Dedicated to the Indomitable Spirit & Sacrifices of the SOF Medic

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Lid laceration and limbus-to-limbus corneal laceration.

From the Editor

The Journal of Special Operations Medicine (JSOM) is an authorized official military quarterly publication of the United States Special Operations Command (USSOCOM), MacDill Air Force Base, Florida. The JSOM is not a publication of the civilian Special Operations Medical Association (SOMA). Our mission is to promote the professional development of Special Operations medical personnel by providing a forum for the examination of the latest advancements in medicine.

Articles, photos, artwork, and letters are invited, as are comments and criticism, and should be addressed to Editor, Journal of Special Operations Medicine, USSOCOM, SOC-SG, 7701 Tampa Point Blvd., MacDill AFB, FL 33621-5323. Telephone: DSN 299-5442, commercial: (813) 828-5442, fax: -2568; e-mail JSOM@socom.mil.

The JSOM is serial indexed (ISSN) with the Library of Congress and all scientific articles are peer-reviewed prior to publication. The Journal of Special Operations Medicine reserves the right to edit all material. No payments can be made for manuscripts submitted for publication.

Official Distribution: This publication is targeted to SOF medical personnel. There are several ways for you to obtain the Journal of Special Operations Medicine (JSOM). 1) USSOCOM-SG distributes the JSOM to all our SOF units and our active editorial consultants. 2) SOMA members receive the JSOM as part of membership. Please note, if you are a SOMA member and are not receiving the subscription, you can contact SOMA through www.somaonline.org or contact MSG Russell Justice at justicer@soc.mil. SOMA provides a very valuable means of obtaining SOF related CME, as well as an annual gathering of SOF medical folks to share current issues.
3) For JSOM readers who do not fall into either of the above mentioned categories, the JSOM is available through paid subscription from the Superintendent of Documents, U.S. Government Printing Office (GPO), for only $30 a year. Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. GPO order desk-telephone (202) 512-1800; fax (202) 512-2250; or visit http://bookstore.gpo.gov/subscriptions/alphabet.html. You may also use this link to send a email message to the GPO Order Desk—orders@gpo.gov. 4) The JSOM is online through the Joint Special Operations University to all DoD employees at https://www.hurlburt.af.mil/jsou/publications/index.php. On the left you will have several tabs; you must first "log-in" using your SS#, DOB, and name; then go to "publications." Scroll down until you get to the JSOM and click on the picture. From this site, you can link straight to the Government Printing Office to subscribe to the JSOM. We are working with the JSOU to have a SOCOM-SG medical site; we will keep you posted as that progresses. 5) The JSOM can also be emailed in PDF format; if you would like to be added to the PDF list please send your request to jsom@socom.mil.

Don't forget to submit CME articles!!!! We have some great articles this edition but there is no CME offering. Remember, our continuing education is for all SF medics, PJs, and SEAL corpsmen. In coordination with the Uniformed Services University of Health Sciences (USUHS), we offer CME/CNE to physicians, PAs, and nurses.

The JSOM remains the tool that spans all the SOF services and shares medical information and experiences unique to this community. The JSOM continues to survive because of the generous and time-consuming contributions sent in by physicians and SOF medics, both current and retired, as well as researchers. We need your help! Get published in a peer-review journal NOW! See General Rules of Submission in the back of this journal. We are always looking for SOF-related articles from current and/or former SOF medical veterans. We need you to submit articles that deal with trauma, orthopedic injuries, infectious disease processes, and/or environment and wilderness medicine. Remember, more than anything, we need you to write CME articles. Help keep each other current in your relicensure requirements. Don't forget to send photos to accompany the articles or alone to be included in the photo gallery associated with medical guys and/or training. If you have contributions great or small… send them our way. Our e-mail is: JSOM@socom.mil.

Enjoy this edition of the journal, send us your feedback, and get those article submissions in to us now!

Maj Michelle DuGuay Landers

From the Surgeon

Frank Butler, MD
CAPT, USN
HQ USSOCOM Command Surgeon

Kudos

Congratulations once more to the USSOCOM Clinic. They have just completed a move from the Flight Surgery spaces at the 6th Aeromedical Group Hospital to the spaces previously occupied by the Emergency Room. This relocation required significant renovations and modifications to the new spaces. The work was carried out by the SOCOM Clinic Team, led by SMSgt Pat Sampson, SMSgt Rick Lepley, and HMC Raul Morales. The move was carried out with minimal disruption to our clinic beneficiaries and the Clinic is now up and running smoothly in it's new location. Congratulations to all involved for this superb effort.

Kudos also to HMC Morales on his recent selection to Senior Chief. In addition to being one of the key personnel in arranging the Clinic move, he has been the primary moving force in setting up the Preventive Health Assessment program now required by the Navy Manual of the Medical Department. This program will ensure that each Navy member at USSOCOM has key risk factors checked on a yearly basis and will do much to promote the long-term health of our sailors.

Farewell

The above paragraph is the good news about the SOCOM Clinic. The bad news is that the clinic is losing one of its most valued members, Col Donna Meyers. Col Meyers has been the OIC of the Clinic since November 2002. During this time, her outstanding leadership has been a major factor in making the SOCOM Clinic the standard for medical excellence and patient satisfaction. Col Meyers has always brought an unfailingly positive attitude, a world-class talent for dealing with people, and superb professionalism to her work at the Clinic. She and her husband Col Mark Meyers (our departing Deputy Chief of Staff) are relocating to the St. Louis area where she will be taking a new position as the Nursing Residency Director for St. Elizabeth's Hospital there. At her going-away party on 7 April, 2006, she received both an award from the command, yet another accolade from General Brown for the clinic, and a number of personal gifts from her friends and colleagues in the SOCOM Clinic and the Command Surgeon's office. All of USSOCOM is going to miss this great lady and great officer.

Taking over from Col Meyers as OIC of the Clinic is Lt Col Becky Lorraine. Lt Col Lorraine has been a Nurse Practitioner at the clinic for many years. She is an excellent clinician, a strong leader, and a top-notch choice to replace Col Meyers at the helm of the SOCOM Clinic. Good luck in the new job!

Tactical Combat Casualty Care Update

Several notable events have occurred in the TCCC department since the last JSOM. First, a paper was published in the February edition of the Journal of Trauma by Holcomb et. al. that documents that the U.S. military is currently experiencing the highest combat casualty survival rate in our country's history. Along with body armor and faster CASEVAC times, one of the major factors mentioned by the authors in achieving

this best-ever survival rate is the superb TCCC-based battlefield trauma care being rendered by U.S. Combat Medics in the current conflict. The Marines, the Coast Guard, and the Navy have now joined the Army and USSOCOM in actively developing strategies to teach and sustain their medics in TCCC.

The second major item of note is the upcoming revision of the TCCC guidelines to be published in the Sixth Edition of the Prehospital Trauma Life Support (PHTLS) Manual. The Committee on TCCC, chaired by Dr. Steve Giebner at the Naval Operational Medical Institute, has been monitoring the combat trauma literature and listening to input from combat medics and trauma surgeons for the past three years. They have made a number of revisions to the TCCC guidelines based on this new information. These changes have now been finalized as described in the letter from Dr. Giebner that follows as the second part of this column. USSOCOM is moving aggressively to implement these new changes into the TCCC Transition Initiative conducted by the Army Institute for Surgical Research in San Antonio and our deploying forces will be learning these new techniques and deploying with the recommended new medications and equipment by the time you read this column. Thanks to the Dr. Giebner and the TCCC Committee as well as to COL Holcomb and SFC Greydanus and their staff at the ISR for their unrelenting efforts to ensure that our combat medics are provided the best possible training and equipment to care for our wounded warfighters.

God bless all of our combat medics and the other medical personnel who support them and our troops. Stay strong and stay safe!

From: Chairman, Committee on Tactical Combat Casualty Care
To: Commander, United States Special Operations Command (SOCS-SG/CAPT Butler

Subj: NEW TACTICAL COMBAT CASUALTY CARE GUIDELINES

Enel: (1) Guidelines for Care Under Fire (2) Guidelines for Tactical Field Care
(3) Guidelines for CASEV AC Care (4) Draft Chapter on Tactical Field Care
(5) Draft Chapter on Care under Fire (6) Draft Chapter on CASEY AC Care

1. The Committee on Tactical Combat Casualty Care (CoTCCC) has approved its latest revision of the guidelines for Tactical Combat Casualty Care (TCCC) for immediate release. Enclosures (1) through (3) show the new guidelines exactly as they will appear in text boxes in their respective chapters in the military medicine section of the sixth edition of the Prehospital Trauma Life Support (PHTLS) manual.

2. As in previous editions of the manual, the bulleted. guidelines depicted in text boxes are synopses of the matter presented in full text of the chapter. The necessary succinctness of this format precludes presentation of all of the detailed information important to training and equipping combatant units for TCCC. For instance, no mention of specific hemostatic agents is made in the section on hemorrhage control in the Tactical Field Care or CASEV AC guide1ines. The text of the chapter on Tactical Field Care (enclosure (4)), however, will recommend that HemCon® be used. Initially, and that QuikClot® be used as a secondary agent in the event that HemCon® fails to control bleeding at a site of compressible hemorrhage. This decision by the committee reflects the fact that there is no clear winner in the ongoing dialogue on the hemostatic agent of choice. Both HemCon® and QuikClot® have been shown to be effective in controlling hemorrhage. The recommendation of HemCon® as the initial hemostatic of choice is based on a desire to minimize pain to the casualty and possible local tissue damage from the exothermic reaction that ensues when QuikClot® is used in a bloody wound site. The use of QuikClot® as a backup agent will ensure that first responders on the battlefield will have another hemostatic agent to use if life-threatening hemorrhage cannot be well controlled with HemCon®.

3. Other new medications and equipment items recommended in the new TCCC guidelines also deserve mention. Meloxicam was chosen to replace rofecoxib, and it is partnered with the extended-release bi-layered

caplet formulation of acetaminophen for p.o. analgesia. Transmucosal fentanyl is recommended for advanced analgesia in the field. Ertapenem has been selected as an additional IV antibiotic appropriate for wound infection prophylaxis on the battlefield. The new hypothermia prevention kit contains the Thermo-Lite® Hypothermia Prevention System Cap, the Ready-HeatTM blanket, and the BlizzardTM Rescue Blanket. Acknowledging the role played by pulse oximeters in combat trauma care, the Committee has included a discussion on the interpretation of pulse oximeter readings. The Committee also recommended the Pyng F.A.S.T. 1® as the intraosseous device best suited for the rigors of battlefield use.

4. I have also included herein drafts of the new chapters on Care Under Fire and CASEV AC Care for your review as enclosures (5) and (6). I hope they will also be of use in your efforts to incorporate the very latest recommendations of the CoTCCC into the USSOCOM TCCC Transition Initiative.

S. D. GlEBNER
By direction

Senior Enlisted Medical Advisor (SEMA)
HMCM Gary Welt

This Enlisted Corner article brings with it some very unique feelings from the guy sitting in the seat here at SOCOM. As I send you greetings and a very deep and heartfelt thank you for doing all within your power to save lives on the battlefields of war, I'm also sending a farewell to all of you for whom I have had the ultimate pleasure and distinction of working with, and most importantly, working for. Without your constant vigilance, personal pride and professionalism, your dedication to your chosen profession, and ultimately, your relentless pursuit to make enlisted Special Operations Medicine, the standard by which all others set their goals; I would not have had the opportunity, the knowledge, nor the powerful voice to serve in the capacity as your Senior Enlisted Medical Advisor to the rest of the civilized medical world. And Lord knows we need that representation out there. Thanks guys!

Well you may have guessed it by now, retirement comes to us all sooner or later, and unfortunately for me, it IS later and in my opinion, has come too soon. It seems as if I just got here yesterday and haven't even learned the job yet, but it's time to head on to other things in life. When MSG Mike Brochu left this job a few years back, he respectfully introduced me as a "Mover and a Shaker", and I hope I have lived up that definition. It was, and still is my intention, to represent the entire Special Operations Medical Force structure, Officer and Enlisted, by ensuring that your operational voice was heard, your multitude of medical requirements and issues were met and your medical prowess was not diminished.

I think personally that we have come quite a distance in the last two years. Some things of change have been difficult and others not so, but regardless, one of the most important things we have done is re-establish communications throughout the medical force. All of the components are represented by the JMEAC and the individual Command Surgeons; it is our responsibility to ensure that we advise the Commander, USSOCOM and provide him the necessary background information to so he can make the correct decisions carry the fight to the enemy.

I do remember what it was and is like to carry a med bag in the field and wonder if anyone in the rears has even the minutest inkling of an idea what the true requirements are out there. I can assure you the messages you send are heard like the "Shot-Around-the-World" was. Everything that you have asked for, within reason, and required to do your job, has been pushed through the system as fast as we could possibly do so to make damn certain that it was in your hands so you could accomplish your mission. I'm sure there are some out there who may disagree with this statement, but my response to you is, "Don't complain about it, do something about it!" What I mean in that response is, as you mature and rise in the hierarchy of Special Operations Medicine, look for and take the hard jobs the aren't always glamorous, exciting and dangerous. Believe me when I say that nobody in SPECOPS wants to grow old and not operate. But with time, your experience, knowledge and professional skills will outweigh your ability to "Keep up with the Young Guns." It is then that you can make a difference, it is then the CSMs and Senior Officers in command will listen to your sage and bulldog like demeanor. It is then that you have the ability to effect positive change and for the better.

Speaking about positive change, the new Senior Enlisted Medical Advisor to USSOCOM and your operational medical advocate for all things in SPECOPS medicine comes to us from Naval Special Warfare Group Four. Many of you know Master Chief Hospital Corpsman Glenn Mercer for many of his lectures on Human Performance and constant diligence to make SPECOPS medicine and the SPECOPS Operator better individually. He will be a breath of fresh air and will definitely push our community to newer heights and further frontiers. I ask all of you to help get his feet wet here at SOCOM and support him in his endeavors to continue to make U.S. Special Operations medicine, the pinnacle of operational medicine that it is today.

Gentlemen, in closing, it has been great ride. Thirty years of toil, tribulation, operational requirements, foreign lands, and most importantly, FUN. I have said this many times before and I will repeat it here. "No one else does what we do, no one else does it better that we do, and no one else gets paid to do all the things that everyone else has to pay to do, except us!

Stay safe, stay healthy and shoot straight. I'll see some of you later in my travels. Until then; Fair Winds and Following Seas.

Meet Your JSOM Staff

EXECUTIVE EDITOR
Frank K Butler, MD
Butlerf@socom.mil

CAPT Frank Butler graduated from Basic Underwater Demolition/SEAL training in 1972 as a member of Class 64 and subsequently served as a platoon commander in both Underwater Demolition Team Twelve and SEAL Team One. After attending medical school at the Medical College of Georgia, he did his internship in Family Practice at Naval Hospital Jacksonville. CAPT Butler spent five years as a Diving Medical Research officer at the Navy Experimental Diving Unit in Panama City, where he helped to develop many of the diving techniques and procedures used by the Navy SEAL teams today. He then did a residency in Ophthalmology at the National Naval Medical Center in Bethesda, where he was Chief Resident in 1989. CAPT Butler was then assigned to the Naval Hospital Pensacola where he was Chief of Ophthalmology from 1989 to 1994. He assumed the duties of Director of Biomedical Research for the Naval Special Warfare Command in 1989 as well. He was transferred to his current position as Command Surgeon, U.S. Special Operations Command, in March 2004.

MANAGING & PRODUCTION EDITOR
Michelle DuGuay Landers, RN

Maj Landers joined the Army Reserve in 1987 and served as a nurse in a Combat Support Hospital unit for three years before switching services in 1990 to become an Air Force C-130 Flight Nurse. She is currently an IMA reservist attached to the SOCOM/SG office where she is in charge of management, production and publication of the JSOM. Maj Landers has a Bachelors in Nursing and a Masters in Business Administration/Management. Her 20 year nursing career includes being a flight nurse in both the military and private sector, 15 years of clinical experience in emergency and critical care nursing as well as being an EMT and a legal nurse consultant. She also served as the military liaison to her Disaster Medical Assistance Team (DMAT.) Prior to the SG office, Maj Landers' experience at USSOCOM includes an assignment in the Center for Force Structure, Resources, Requirements, and Strategic Assessments.

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USASOC

Rocky Farr, MD
COL, USA
Command Surgeon

Last USASOC component surgeon's column in the last issue of the JSOM, I said my goodbyes from USASOC and said I was PCS-ing to USSOCOM Headquarters in Tampa. Still am. The next issue will show that that has happened, I report 1 June 2006. Having thanked my office and various others individuals for their support for the last seven years at Fortress Bragg, let's move on.

I just, finally, completed the assignments for new medical officers, veterinarians, physician assistants, physical therapists, medical operators, et cetera, et cetera, to USASOC. It has been another great year of many more applicants than slots. I am really pleased with the quality of those asking for assignments. Good luck to them all. I also think it is great that our Army Medical Department (AMEDD) officers are staying and returning for repeat assignments. We are finally developing tactically competent SOF surgeons with wide ranges of experience in all of our different types of ARSOF units. LTC Brown and MAJ Benson have run the assignment process and have done it expertly.

In my column in the last issue of the JSOM I discussed how Lieutenant General Yarborough, a Special Forces legend had died. Last Saturday (4 March 2006), I attended the funeral of another Special Forces legend-CW4 Arthur T. Olsson. I first met SFC Art Olsson in 1967 when he was my operating room instructor at "Med Lab." Also in that OR group was now Major Buck Benson, the USASOC Command PA. Art Olsson taught us how to be SF medics. He had gone through the course in the very early days and was a seasoned Special Forces sergeant by the time I came along. After surviving Art's instruction, I encountered him next in Vietnam where he ran the Civilian Irregular Defense Group (CIDG) hospital at the Special Force's compound in Pleiku. Art then went to Army physician assistant's school in one of the first classes and taught in the PA course at Fort Sam Houston, Texas. When I was commanding Company F (Airborne) and running the 300-F1 course (the 1st half of 18D training when it was at Fort Sam Houston) I managed to get Art into the company and into the course to teach orthopedics. Art was the master of teaching orthopedics. During my time there, we retired Art in grand style with a parade on the AMEDD Center and School's parade field at Fort Sam Houston with plenty of green berets in attendance.

When I got to Fort Bragg in 1999 I started to look for Art. He had had several health problems, all in one year, and was looking poorly. As he recuperated, I encouraged him to come to the JSOMTC to volunteer and help out. After a while, he ended up being hired to teach as a civilian instructor and it was great to see him back in action. Colonel Kevin Keenan and I both used to counsel him about walking up the stairs carrying his oxygen supply rather than taking the elevator. Art re-retired this fall and died last week. So Saturday, 4 March 2006, we laid him to rest in Fayetteville, with plenty of green berets in attendance. Rest in Peace, CW4 Arthur T. Olsson. 5 February 1941-1 March 2006.

In this issue of the JSOM you will see article two[1] in my continuing series of articles looking at unconventional warfare medical doctrine. The first[2] looked at the civilian books available and this one looks at the first field manuals and early (World War II) lessons learned. I am always on the look out for articles on guerrilla warfare medicine, early Special Forces medicine, and the like. My email after 1 June should be warner.farr@socom.mil. Just at the conventional army is busy re-learning counterinsurgency warfare and publishing "new" doctrine and field manuals; we need to ensure we are current on insurgency doctrine, especially medical. I am continually adding to my book list that has appeared twice[3] in the JSOM. I am happy to take suggestions. Plans for future articles include lessons learned from guerrilla winter warfare in World War II and Marine Corps doctrine. The Marines spent half of the last century either fighting guerrillas in Central America or in China; they are no newcomers to SOF. A Marine brigadier is the guy who translated Sun Tzu!

Between my departure in mid-April and Colonel Joe Caravalho's arrival at USASOC in late June, Colonel Dalton Diamond will be in charge. "D2" as we usually refer to him as, is a Special Forces qualified medical officer reservist who has been on active duty since the war started and has been a great second in command/alter ego allowing me the ability to wander as I saw fit without worrying about the office. I owe him a very large thank you for a job wonderfully done. Also, I have enjoyed the interactions with the other component surgeons and senior enlisted advisors. It is nice to stay in the community even if I'm moving further from the sound of the guns…

Reference:

1. Farr Warner D. Guerrilla Warfare Medicine: A Review of the Literature and the Problem. *Journal of Special Operations Medicine* Winter 2006; Vol 6(1): 18-31.

2. Farr Warner D. American Guerrilla Warfare Medical Doctrine – The First Manuals: Lessons Learned. *Journal of Special Operations Medicine* Spring 2006; Vol 6(2):23-33.

AFSOC

Dan Wyman, MD
Col, USAF
Command Surgeon

AThis will be my last submission. After almost three years at HQ AFSOC it is time to move on. I have enjoyed every minute…particularly working with and for the best warriors and medics in the world. We have achieved many significant milestones within the SOF medical community over the last several years and I expect many more successes in the future. Col Tim Jex will become the new AFSOC/SG this summer. Col Jex is currently the 16th Medical Group Commander at Hurlburt Field and is very engaged in "hands-on" medical care of our special operators. Previously he was the CENTAF/SG and was the chief architect of AF medical laydown in the CENTCOM AOR in support of the GWOT shortly after 9-11. He is a Chief Flight Surgeon with a wealth of operational experience…just the person to lead AFSOC to the next level and beyond. The next several years will be an even greater time to be an AFSOC Amedic…I will be watching your progress with much anticipation.

I thank you for your tremendous service. If your work or leisure takes you to the Pacific AOR by way of Hickam AFB, do not hesitate to look me up. Please take care of yourself, your family, and your fellow airmen, soldiers, and sailors and may God bless you and keep you safe!

Uniformed Services University
of the Health Sciences

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April 14, 2006
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USU launches first phase of WMD collaborative medical readiness initiative

Bethesda, Md. – The Uniformed Services University of the Health Sciences (USU) announced the first phase of its Weapons of Mass Destruction Collaborative Medical Readiness Initiative.

The initiative offers tuition-free online education about chemical, biological, radiological/nuclear, and explosive (CBRNE) incidents for civilian, uniformed emergency responders and healthcare providers across the nation. The program is a self-paced, flexible program that introduces educational activities through a fictional scenario or by learning objectives. The site is available at: http://opep.usuhs.edu/.

The program was developed by the Center for Disaster and Humanitarian Assistance Medicine (CDHAM) at USU in collaboration with experts from the Department of Defense, Department of Health and Human Services, Department of Homeland Security, United States Public Health Service, Centers for Disease Control and Prevention, Veterans Administration and the Armed Forces Radiobiology Research Institute.

USU is accredited by the Liaison Committee on Medical Education and the Middle States Association of Colleges and Schools. The Online Preparedness Education Program has been planned and implemented in accordance with the Accreditation Council for Continuing Medical Education (ACCME) and the American Nurses Credentialing Center's Commission on Accreditation. USU is accredited by both agencies to provide continuing medical education (CME) for physicians and continuing nursing education (CNE) contact hours for nurses. A certificate of completion with continuing education credits is available to participants not eligible to receive CME or CNE. Up to sixteen CME hours or nineteen CNE hours will be honored to participants who register and successfully complete program requirements.

USU is the nation's federal school of medicine and graduate school of nursing. The medical students are all active-duty uniformed officers in the Army, Navy, Air Force and U.S. Public Health Service who are being educated to deal with wartime casualties, national disasters, emerging infectious diseases and other public health emergencies. The university's motto is "Learning to Care for Those in Harm's Way." For more information about USU visit: www.usuhs.edu.

Voluntary Mental Health Self-Assessment Program available for military families and personnel at www.MilitaryMentalHealth.org

Military personnel and their family members can take advantage of the new Mental Health Self-Assessment Program (MHSAP) available online, 24/7 at www.MilitaryMentalHealth.org. This anonymous program, funded by the Department of Defense Office on Health Affairs, is available worldwide and provides the user with immediate results and resources covered by the military.

The online mental health and alcohol self-assessment program offers screenings for a range of common emotional situations that often go undiagnosed and misunderstood. It is a proactive approach to help families and service personnel identify their own individual symptoms and access assistance, hopefully before a problem becomes urgent. The tests available address depression, bipolar disorder, generalized anxiety disorder, and post-traumatic stress disorder, as well as alcohol use. Users have complete flexibility and can move from screening test to screening test with ease. After completing whichever assessments you would like, you are provided with referral information customized to military health services.

Questions included on the online assessment are:

- Have you lost pleasure in things you used to enjoy?
- Do you have trouble sleeping or eating?
- Does your mood fluctuate between overly “high” to sad and hopeless?
- Are you keyed up and anxious all the time?
- Are you having nightmares about something that happened in the past?
- Do you suffer from unexplained aches and pains?

Once the self-assessment is completed, users will be given information on where to turn for a full evaluation such as services covered by TriCare and other military programs. MHSAP is an extension of the DoD's ongoing efforts to reach families and service members with the information they need about services available to them. Unlike the mandatory post-deployment health surveys, this new program is voluntary, anonymous and is accessible any time. It will serve troops that develop symptoms later, or who want to test themselves anonymously before seeking help. It is also for family members, who otherwise do not have a self-assessment mechanism.

This program is offered without charge through the nonprofit organization Screening for Mental Health with funding from the Department of Defense Office of Health Affairs.

For more information, Contact: Katherine Cruise, 781-239-0071 x119 or Joelle Reizes, 513-683-1599

Common Spelling Errors compiled by Gay D. Thompson, RN, MPH, CHES: Spelling is particularly important when a computer is utilized to search the text for a certain word. These are the correct spellings of some commonly misspelled medical terms. The "trouble spots" in the words are typed in red.

abscess
accommodation
acetaminophen
albumen
amoxicillin
analgesic
aneurysm
anesthesia
anus
arrhythmia
arthritis
asthma
atresia
axillary
basal
basophil
brachial
breech
callus (noun)
canker
cartilage
catheter
cecum
chancre
cholera
chorea
chlamydia
cocaine
codeine
colon
conjunctiva
conscious
Crohn's disease
decubitus
debridement
diabetes mellitus
diaphragm
diarrhea
dilation
diphtheria
dysentery
ecchymosis
elicit
emphysema
empyema
epiphysis
epistaxis
erythema
exacerbate
fasciitis
fibromyalgia
fibrous
filariasis
foramen
funduscope
giardiasis
gonorrhea
Guinea worm
helminth
hematoma
hemorrhoid
hepatitis
humerus
hymen
hypnic
iliopsoas
ileus
ilium
impetigo
incontinence
inflammation
intussusception
larynx
leukemia
liquefy
Lyme disease
lymph
lymphedema
malaise
malleolus
malleus
maneuver
melanoma
menorrhagia
menstruation
migraine
mnemonic
mucous (adjective)
mucus (noun)
myofascial
neurology
Novocaine
ophthalmoscope
oriented
palate
palliative
parenteral
paroxysmal
pathognomonic
penicillin
perineal
peritoneum
peroneal
persistent
petechia (singular);
petechiae (plural)
phlegm
plantar
pleurisy
pneumococcus
pneumonic
pore
preventive
prostate
prosthesis
pruritic
pruritus
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tetanus
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Compartment Syndrome of the Lower Extremity: Blast Injuries in a Ranger Battalion Don't Miss The Diagnosis!

John F. Detro, PA-C

Abstract

Compartment Syndrome is a commonly missed diagnosis on the battlefield. The combat medic or medical officer consider the diagnosis during the evaluation of blunt and penetrating trauma. Correspondence with Landstuhl Army Medical Center providers revealed over 60 missed cases in the early phases of Operation Iraqi Freedom.[1] The consequences are great (permanent loss of neuromuscular function) and the treatment is fairly simple (emergent fasciotomy). Diagnosis during the late symptoms (pallor, pulselessness) lends to poor long-term results to include loss of life or limb. Therefore, we must maintain our vigilance in watching for the early signs/symptoms to ensure timely intervention. Patients must be reevaluated)during intra and intertheater evacuation and during hospitalization. Patients presenting with pain out of proportion to symptoms should be observed carefully. The non-surgical medical provider must aid the surgical team in monitoring patients who may be referred to wards awaiting evaluation during MASCAL situations. This article results from the compartment syndrome cases resulting from grenade injuries during two raids while conducting combat operations in Iraq. The accompanying After Action Review (AAR) discusses the casualties from a specific mission and reveals the high rate of compartment syndrome cases related to grenade effects.

Objectives

1. Discuss the epidemiology of compartment syndrome.
2. Define and discuss the etiology of compartment syndrome.
3. Describe the basic anatomy of a fascial compartment.
4. Describe the pathophysiology of compartment syndrome.
5. Describe the signs and symptoms of compartment syndrome.
6. Develop a basic understanding of diagnostic tools utilized for early determination of compartment syndrome.
7. Provide basic knowledge of surgical and non-surgical procedures for dealing with developing compartment syndrome.
8. Discuss complications of compartment syndrome.
9. Provide examples of compartment syndrome which occurred during real world combat operations (accompanying AAR).
10. Enhance the special operations medical provider's repertoire for early diagnosis and referral of compartment syndrome patients.

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Introduction

Emergent compartment syndrome (as opposed to exercise induced or non emergent compartment syndrome) can be a serious consequence of trauma occurring on the battlefield. Compartment

syndrome can occur in combat secondary to splinting, intravenous infiltration, blast injuries (IED's, bombs, mortars, or grenades), penetrating trauma (gunshot wounds, grenades), or blunt trauma (motor vehicle accidents, air assault, and airborne injuries).[1] The author spoke to members of the Landstuhl Army Medical Center during the early stages of Operation Iraqi Freedom, learning that over 60 missed cases of compartment syndrome had been diagnosed at their center. It is clear that early recognition and intervention has a profound impact on morbidity regarding this condition. This article will briefly review the epidemiology, anatomy, and pathophysiology of this condition and provide information on the diagnosis and treatment of compartment syndrome. This article will add insight and add credence to the importance of vigilance in the early diagnosis and surgical referral of this condition by pre-hospital medical personnel.

Epidemiology

The most recent data from the Joint Theatre Trauma Registry reveals 125 injured military members with a complicating compartment syndrome.[2] Colonel James Ficke (personal correspondence), an orthopedic surgeon who served as the Deputy Commander for Clinical Services (DCCS) for the 228th Combat Support Hospital (CSH), reported 60 fasciotomies in just less than one year with a case load of 2760 surgical procedures and 1622 trauma admissions. In 1993 the 46th CSH deployed to Mogadishu, Somalia and during the Battle of the Black Sea performed two fasciotomies while conducting 56 operative procedures on 31 patients.[3] Yearly, thousands of Americans sustain emergent compartment syndrome resulting in increased morbidity and mortality. The incidence of compartment syndrome is directly related to the inciting event with high energy trauma resulting in greater rates. Therefore, open wounds are more likely to develop compartment syndrome as opposed to closed injuries. DeLee and Stiehl found 6% of open tibial fractures developed compartment syndrome whereas only 1.2% of closed injuries developed into compartment syndrome.[4] Compartment syndrome occurs most commonly in the forearm and lower leg, with less frequent occurrence in the thigh and upper arm.

Definition/Etiology

The first description of compartment syndrome was provided by Richard von Volkmann in 1872.[5] He described contractures of the forearm muscles secondary to compressive forces of casting of a closed fracture. The contractures were due to ischemic muscle necrosis and were termed Volkmann Contractures.

Compartment syndrome develops when increased tissue pressure in a myofascial compartment increases to a point that blood flow to the muscles and nerves is impaired.[6] The resultant ischemia causes tissue and nerve damage leading to cellular death. Symptoms worsen acutely, and if the condition is not quickly reversed individuals develop irreversible damage to nerves and muscles leading to permanent deficits or rarely death.[7] Compartment syndrome may result from either externally applied compressive forces or internally expanding forces. The following equation depicts increased tissue pressure exceeding capillary pressure leading to ischemia:

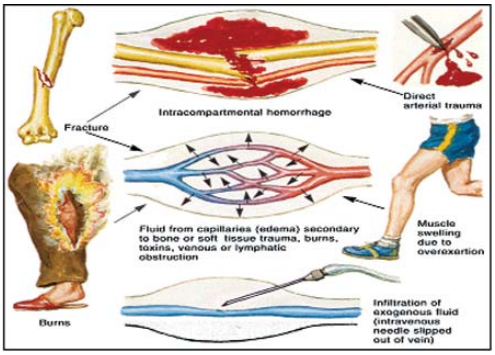
$$\mathbf{P_{Tissue} > P_{Capillary} = Ischemia}.$$

Below are examples of conditions or mechanisms of injury, which may lead to the development of compartment syndrome: [1]

- Penetrating trauma (fragments) either from gunshot wounds or secondary blast effects (flying debris) of grenades/mortars
- Fractures -- closed and open
- Vascular injuries[8]
- Blunt trauma to include crush injuries[9]
- Temporary vascular occlusion (Deep venous thrombosis)[10,11]
- Cast/dressing[12]
- Closure of fascial defects
- Burns/electrocution
- Exertional states (weight lifting or overuse)
- Intravenous/Intravascular/Interosseous fluid sequestration[13]
- Hemophilia/coagulopathy
- Snake bite[14]
- Arthroscopy[15]
- Lithotomy position during procedures[16]
- Military Antishock Trousers (MAST)[17]
- Steroid use

The majority of cases of compartment syndrome (roughly 45%) are due to tibial fractures. These fractures generally involve high levels of energy with many being open fractures. The erroneous belief that an open fracture leads to a release of intra-compartmental pressure and decompression of this condition is patently false.[4,18] In fact, open fractures by the nature of the applied force, are more prone to the developing a compartment syndrome.[19] In addition,

certain predisposed individuals who have exercise induced compartment syndrome (higher resting pressure levels) may develop emergent compartment syndrome from relatively minor insults such as ankle sprains and lifting weights.[20] The author treated a patient who developed compartment syndrome after running two miles; and as well as another individual who developed compartment syndrome from sustaining a sprained ankle during a road march. The patient tightened his boot, completed the march, and reported to the battalion aid station several hours later with an established compartment syndrome leading to permanent disability following delayed fasciotomy.



Anatomy

The extremities contain compartments which are surrounded by a thick fascia. Fascia has a consistency of a brown paper bag and is essentially the same as the gristle from meat, being thick and non-compliant. The fascia encloses the muscles, nerves, and vasculature. If increased fluid with the compartment occurs, if there is muscle hypertrophy within the compartment, or if increased externally applied pressure (cast, burns) decreases the space for the compartment, then an emergent compartment syndrome may ensue.

Compartment syndrome may occur in the abdomen and other truncal locations, but the majority of cases are diagnosed within the extremities. This article is not designed to describe the anatomy of all fascia compartments but will focus on the lower leg which is the most frequently involved limb. There are four compartments in the lower leg to include: [21]

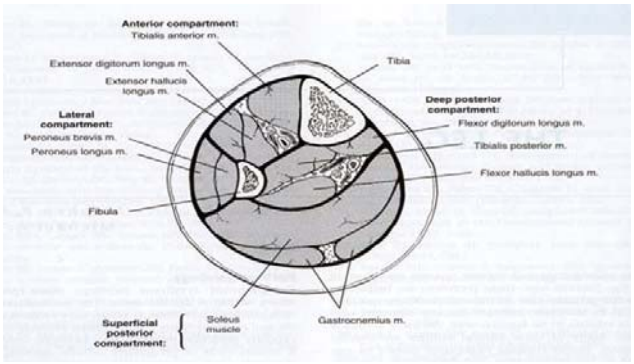
Anterior Compartment - contains the tibialis anterior, extensor digitorum longus, extensor hallicus longus, and peroneus tertius muscles, anterior tibial artery, and deep peroneal nerves (sensation to the first web space of the foot).

Lateral Compartment - contains the peroneus brevis and longus (plantar flexion and eversion of the foot/ankle) muscles and the superficial peroneal nerve (sensation to the dorsum of the foot).

Deep Posterior Compartment -contains the plantar flexors and phalangeal flexors (tibialis posterior, flexor digitorum longus, and flexor hallucis longus muscles), the posterior tibial and peroneal arteries, and the posterior tibial nerve (sensation to the sole of the foot).

Superficial Posterior Compartment- comprises the plantar flexors of the foot to include the gastrocnemius, plantaris, and soleus muscles, and the sural nerve (sensation to the lateral aspect of the foot). [1,21]

(Four fascial compartments of the lower leg)



Pathophysiology

Compartment syndrome develops as elevated tissue pressure within a closed fascial space reduces tissue perfusion ultimately leading to cell death.[22-25] The cause is a combination of too much inflow (edema, hemorrhage) or too little outflow (venous obstruction). The exact pathophysiology is not clearly understood, but most authorities on this subject feel that the major cause of a compartment syndrome is Tissue Pressure>Total Capillary Pressure leading to capillary collapse. The resulting loss of venous outflow in the face of continued arterial inflow, coupled with the vascular wall changes that occur in trauma, leads to increased diffusion of fluid from the intravascular space to the extravascular space. Eventually, increased interstitial (or change to intravascular) pressure leads to edema and inability to evacuate fluids through venous channels. This pressure increase prevents oxygenated blood from reaching muscle tissue, leading to muscle necrosis and nerve dysfunction. The result is tissue pressure which is greater than capillary pressure, resulting in

tissue ischemia and eventually irreversible cell damage/death.

In 1995, Shrier and Magder questioned the traditional hypothesis and postulated that a critical closing pressure (vascular adrenergic tone) is exceeded, leading to increased vascular resistance and decreased flow, leading to compartment syndrome. Their theory postulated that both pressure and vascular tone affected the compartment. The exact pressure at which this occurs is debated, but if untreated, after six to ten hours the final result is muscle infarction, tissue necrosis, and nerve damage, leading to permanent disability or potentially loss of the limb. Shrier and others suggest that a compartment measurement over 30mmHg requires surgical intervention.[26] However, in 1975 Whitesides noted that comparison between the patients diastolic and compartment pressures was a more reliable determinant for surgical intervention in hypotensive, traumatized patients. He stated that fasciotomy should be performed when the compartment pressure rises to within 10 to 20mmHg of the diastolic measurement.[27] McQueen confirmed this finding, but stated that 30mmHg was the high end cut off in normotensive patients.[28] The bottom line is that recent researchers postulate that the comparison of compartment measurements to diastolic blood pressure is a more reliable indication of need for fasciotomy than the utilization of an absolute pressure measurement (e.g., 30mgHg regardless of BP).

Damage to muscle can lead to the release of myoglobin leading to renal failure (rarely, but increased with crush/burn injuries) if not addressed early and aggressively.[9] Surgical intervention in established compartment syndrome (after six hours) will not lead to improvement in function and can lead to severe consequences (loss of limb or rarely life) from exposing the contents of the compartment to highly aggressive Gram-negative organisms. Therefore, early diagnosis and intervention is crucial.

Assessment/Diagnosis

The diagnosis of emergent compartment syndrome relies on the vigilance of the examiner. The special operations medical provider must understand and be cognizant of the mechanism of injury, symptomology, anatomy, and pathophysiology of this condition. A missed or delayed diagnosis can have a profoundly negative impact on the long-term outcome of the patient.

History/Mechanism of Injury: The typical patient with a developing compartment syndrome *presents with pain out of proportion to physical examination findings.* These patients may writhe and scream for pain relief. The keen observer with knowledge of compartment syndrome will quickly assess this patient as understanding the various mechanisms of injury may be critical to the diagnosis. The patient who has sustained a high energy injury from penetrating trauma, blunt trauma, burns, crush injuries, and is intoxicated or unconscious should arouse a high state of suspicion.[29] Again, there is a misperception that open fractures decrease the risk of compartment syndrome secondary to an open fascial defect. The patient with an open fracture has a high-energy injury and is *more likely* to develop a compartment syndrome

Physical Examination: The classic five P's are mostly late findings for compartment syndrome and should not be routinely relied upon for the diagnosis.[1] The medical provider's goal is to identify the condition prior to the finding of *pallor, pulselessness, and poikilothermia (coolness)* which are late findings. Along with tense compartments, the complaint of *paresthesias* and finding of *pain out of proportion* to physical examination findings are the only reliable early findings. The physical examination is the key to diagnosing this condition but should be carried out carefully to avoid excessive movement which will increase pain and may cause further injury. The following is a recommended examination protocol. The provider will always compare findings to the contralateral limb.

Inspection: The examiner looks for open wounds, ecchymosis, abrasions, deformities, burns, swelling, and a tense compartment.

Palpation will reveal the location of pain, crepitus, tenseness, and deformities (fractures). The most reliable palpation finding is a tense compartment with palpation.

Movement: Injuries leading to compartment syndrome can be extremely painful, the limb may be unstable, and neurovascular injuries are likely. For these reasons, the examiner should stabilize the extremity while performing a thorough examination. The patient's pain level may prevent an accurate assessment of active and passive range of motion. In addition, the performance of strength testing can be challenging.[30,31] However, the provider should still

attempt to perform this testing. The patient with a developing compartment syndrome will instinctively contract the muscles of the extremity in a flexed position to relieve pressure on the contents of the compartment. Patients with anterior compartment syndrome will instinctively (relieve pressure) dorsiflex the foot whereas those with a deep posterior compartment syndrome will plantarflex the foot. Therefore, the clinically most reliable early examination finding is pain with passive stretching of the involved muscles. The patient will have extreme pain with this maneuver which tends to be a more reliable early finding than a tense compartment. Pain with passive extension of the toes (deep posterior compartment), ankle dorsiflexion (superficial posterior compartment), flexion of the toes/ankle plantar flexion (anterior compartment), and foot inversion (lateral compartment) can be utilized to determine the involved compartment.[22] However, remember that most cases involve multiple compartments so many of the above passive stretches may be positive.

Passive Stretch Test: Toe flexion and ankle dorsiflexion is painful for anterior compartment syndrome and ankle inversion for lateral compartment syndrome.

Passive Stretch Test: Toe extension is painful for deep posterior and ankle dorsiflexion is painful for superficial posterior compartment syndrome.

When time is available, the special operations provider should perform a detailed but quick neurovascular examination of the affected limb (providing a baseline), while remembering that decreased sensation and lack of distal pulses are unaffected until extremely late.

Vascular examination of the foot must include both a check of capillary refill along with palpation of the two major arteries. The dorsalis pedis artery is located on the dorsum of the foot, whereas the posterior tibialis artery is located posterior to the medial malleolus.[30,31] During situations where the pulse is diminished or lacking, hospital personnel may utilize a Doppler ultrasound device to better determine flow. Following a diminished flow, an Ankle Brachial Index (ABI) would be performed. This procedure includes measuring the individual's systolic blood pressure (upper extremity) and then placing the cuff on the ankle of the injured extremity while inflating until loss of the distal pulses. These two numbers are compared with a normal ratio being 1:1 (both pulses equal) with a decrease suggestive of a vascular insult (<9).[32] Civilian trauma centers may conduct further studies to include arteriography to identify insult locations, providing valuable information to the vascular surgical team.[8]

The neurological examination can be challenging secondary to the patient's condition but should include testing of light touch, two point discrimination, proprioception, and ankle deep tendon reflexes. The earliest neurological finding may be a decrease in two point discrimination. According to Whitesides, Rockwood, and Green, sensory loss is typically a late finding representative of an established compartment syndrome in the absence of direct nerve trauma.[27] However, testing of light touch should still be conducted with a decrease suggestive of an emerging compartment syndrome. Sensory nerves to be tested include the deep peroneal nerve (first web space), superficial peroneal nerve

Deep peroneal nerve

(dorsum foot), plantar nerve (bottom surface of the foot), and the sural nerve (lateral foot).[31]

The alert provider will assume that a patient has a compartment syndrome given the proper history, mechanism of injury, and appropriate examination findings, until proven otherwise by an orthopedic surgeon. These patients fall within the evacuation category of urgent surgical and their transfer should not be delayed unless unavoidable.[29]

Diagnostic tests are not routinely performed by Forward Surgical Teams (FST). However, upon transfer to the Combat Support Hospital (CSH) or civilian trauma centers various diagnostic steps may be taken by the accepting provider. These tests include:

Laboratory studies: These tests are not necessary for diagnosis and should never be a cause of delay in referral to a surgeon.[1,9,23]

Serum myoglobin and CK-MB to measure risk and provide baselines for treatment of Rhabdomyolysis
BUN/Creatine for renal function measurement
CBC with coagulation studies as anemia increases ischemia
Urinalysis to evaluate myoglobin and CK-MB

Radiographs: Plain films are performed to determine presence of fractures (high energy mechanism of injury) and assist in the surgical planning. For example, patients with tibial plateau fractures have a nearly 40% chance of developing a compartment syndrome. The finding of a fibular shaft fracture reveals the potential for multiple compartment involvement secondary to movement of hematoma through the interosseous membrane.[18] MRI and CT are not routinely utilized but may show increased intensity on T2 weighted spin sequences.[1]

Pressure Measurements: The Emergency War Surgery Handbook recommends performing the fasciotomy instead of pressure measurements if a patient has a clinically suspected compartment syndrome.[29] Even in civilian trauma centers, the utilization of pressure measurements are not routinely performed to confirm highly probable cases. However, these tests may be used for less likely cases, or when the patient has multiple injuries, are unconscious, or are intoxicated.

Several physicians have developed theories for the determination of when fasciotomy is warranted.[33-42] The Absolute Pressure Theory prescribed a specific fixed reading for the determination of compartment syndrome. Mubarak set the number at 30mmHg whereas Matsen utilized 45mmHg.[22,23,35] Whitesides developed the Pressure Gradient Theory which stated that the number was not important until related to another value - diastolic blood pressure. Whitesides stated that if the patient's pressure measurements were within 20mmHg from the diastolic pressure, then fasciotomy was warranted. Like Mubarak, Whitesides postulated that a patient could be hypotensive and have a value less than 30mmHg but still have an elevated compartment pressure being within 20mmHg from the diastolic number.[27, 34-38] The majority of orthopedic surgeons utilize both theories. If the patient is normotensive, the number cited for fasciotomy is generally 30mmHg, whereas if hypotensive the comparison with diastolic pressure is utilized. However, neither test replaces surgical intuition nor physical examination findings, meaning a normal reading would not preclude a release if deemed warranted.

The Stryker device is the most commonly utilized pressure measurement device because it is accurate, commercially available, and has a side port on the needle (decreased tissue plugging). Other techniques include the utilization of arterial lines and needles lacking side ports. During testing, the needle tip should be approximately 5mm from the wound site for accurate measurement (fracture, etc.). The device contains a syringe with sterile saline. The examiner holds the device level and inserts the needle into all four compartments injecting 5ml of saline under sterile conditions. The measurements are recorded on the patients chart. The normal pressures

Stryker Device

within a compartment range from 0 to 4mmHg during rest and 8 to 10mmHg with exertion.

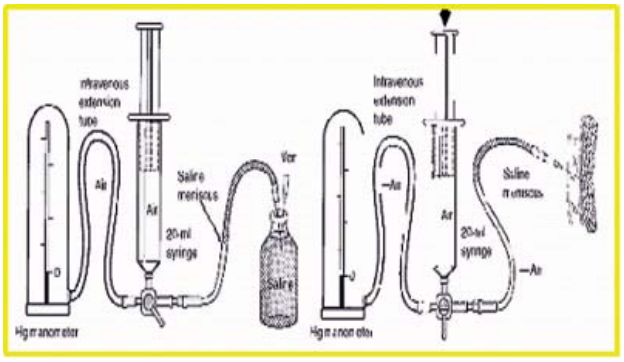
Whitesides developed a simple, reliable technique of compartment pressure measurements utilizing equipment readily available in emergency departments.[34,37] According to his study; this procedure has an accuracy rate of plus or minus 3mmHg. However, several authors have found the utilization of a simple needle leads to an elevated pressure of 19.3 millimeters compared to a side port.[39] Therefore, the Whitesides method has been replaced by the Stryker device at most medical facilities, but could still be practical for field expedient measurements. This technique may assist the medical provider while deciding to evacuate versus holding a patient. The equipment required includes two plastic extension tubes, two 18 gauge needles, one 20ml syringe, one three-way stopcock, one vial of sterile saline, and one mercury manometer (not JCAHO approved).

The steps in the technique include

1. Cleanse and prepare the extremity (sterile technique if practical).
2. Break the vacuum of the sterile saline bottle.
3. Assemble the 20ml syringe with the plunger at the 15ml mark; attach the three-way stop cock, plastic extension tube, and one 18 gauge needle.
4. Insert the tip of the 18 gauge needle into the saline and aspirate while (avoiding bubble formation) filling the extension tube approximately half the length. Turn the stopcock to the closed position so saline is not lost during the transfer of the needle.
5. Remove the needle and replace with a sterile 18 gauge needle.
6. Insert the 18 gauge needle into the muscle compartment to be measured.
7. Connect the second extension tube to the manometer and the open end of the stopcock. Turn the stopcock so the syringe is open to both extension tubes forming a "T" connection. This forms a closed system so air can flow freely into both extension tubes as the pressure within the system is increased.
8. Increase the pressure by gradually compressing the syringe plunger while watching the saline column. The mercury manometer will rise until the system pressure equals the tissue pressure leading to a small amount of saline being injected into the tissue. When the saline column moves (meniscus), stop applying pressure and read the manometer. The reading is the tissue pressure in millimeters.
9. Repeat steps for all compartments.
10. Determine if measurements are within normal range or represent elevated levels.

The procedure is fairly simple but mistakes can occur. The most common mistake is rapid syringe depression causing excessive saline injection within the tissues making false elevation of the manometer measurement. If the needle does not pass through the fascia or if a tissue plug enters the needle a higher reading may result.[34]

The provider may elect to monitor patients with normal measurements. However, readings should be repeated every one to two hours while observing for signs and symptoms of compartment syndrome. If evacuation is delayed, measurements should be continued until pressures decrease or fasciotomy is indicated (urgent evacuation).



The differential diagnosis of compartment syndrome includes arterial occlusion, peripheral nerve injury, muscle rupture, and deep vein thrombosis.[1]

Management/Treatment

Vigilance is crucial for the early recognition and treatment of compartment syndrome to prevent irreversible tissue damage. Several prominent authors have proposed the following timeline for muscle and nerve damage:[1,6,22,23,38]

Muscle Necrosis

Three to four hours - reversible changes
Six hours - variable damage
Eight hours - irreversible changes

Nerve Necrosis

Two hours - looses nerve conduction
Four hours - neuropraxia
Eight hours - irreversible changes

The initial care of trauma patients starts with treatment of the ABC's. Following initial trauma management, the prudent provider will determine the neurovascular status of the patient's injured extremity. If compartment syndrome is a consideration, the provider will loosen or remove constrictive clothing, jewelry, splints, or casts and place the extremity at the level of the heart allowing for continued vascular flow. Elevation of the extremity is contraindicated as it will lead to a decrease in arterial flow into an already compromised extremity.[42] In addition; the provider will treat causative conditions such as hemorrhage or snake bites and most importantly ensure the patient is transported emergently to an orthopedic surgeon. Studies regarding the utilization of mannitol and hyperbaric oxygen for the medical management of compartment syndrome are ongoing, but inconclusive.[44,45] Emergent fasciotomy is the only proven definitive method of care. The two double-incision approach developed by Mubarak is currently the gold standard.[46] The key is release of all compartments regardless of whether it is deemed involved. A brief description of this procedure can be found in the Emergency War Surgery Handbook.[29] If diagnosed after eight hours, it is recommended to treat the injury conservatively as delayed surgical intervention will lead to a high risk of post surgical infection secondary to Gram-negative anaerobic organisms. The risk of infection is not warranted as the injury is irreversible at this time.[1,14] The Emergency War Surgery Handbook recommends prophylactic release for high-energy trauma in intubated, comatose, or sedated patients. In addition, consideration should be given for patients with closed head injury, casts/splints, vascular repair, prolonged transport times, or a high index of suspicion.[29]

Complications

Fasciotomy performed at CSH

The major complications of compartment syndrome include residual muscular defect (decreased with early intervention) with loss of function, foot drop for delayed or inadequate treatment, contractures, chronic pain/disability, loss of limb from the original injury or infection and rhabdomyolysis leading to renal failure or even death.[1,9,14,47]

Conclusion

The early diagnosis and intervention for compartment syndrome is the key for long-term functional recovery of limb function. A delay in diagnosis, long or delayed transport times, and subsequent delayed surgical release can lead to permanent defects resulting in long term consequences such decreased limb functioning, resulting in medical release from military service, difficulty performing activities of daily living, or inability to participate in hobbies or sports. The key to preventing these sequelae is to maintain a high index of suspicion and attempt early transport for emergent surgical fasciotomy. The contributing factors of long or delayed evacuation times and lack of patient reassessment can lead to increased preventable occurrences of this condition. The special operations medical provider must remain vigilant in his reassessment of trauma patients with delayed or prolonged evacuation times. The patient with compartment syndrome is a surgical emergency and must be evacuated for definitive care in a timely manner. The author witnessed over 10 cases of compartment syndrome over a one month period due to an increased rate of blast injuries secondary to enemy employment of grenades for defensive purposes (see after action review on page 45.

CPT Detro and LTC Tom McCrory (82nd AB FST) perform an emergent fasciotomy and removal of a bullet from the leg of a casualty.

Acknowledgments

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American Guerrilla Warfare Medical Doctrine – The First Manuals: Lessons Learned

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Abstract

The author reviews both the guerrilla or unconventional warfare (GW/UW) military doctrinal literature published shortly after World War II and its subset of medical guerrilla warfare doctrine. He identifies areas in the post-war doctrine demonstrating medical lessons learned from World War II guerrilla operations conducted or supported by the American Office of Strategic Services (OSS) and the British Special Operations Executive (SOE) and cross-references the lessons learned to the published literature.

Objectives

1. Describe the extent of the post-World War II medical guerrilla warfare doctrinal literature.
2. Explain the difficulties of providing medical services to a guerrilla force.
3. Discuss how World War II practitioners of GW/UW incorporated lessons learned into military guerrilla warfare medical doctrine.
4. Discuss trends in the structures of unconventional warfare medical services.

Introduction

A previous article in this journal discussed the published sources available for the study of guerilla warfare/unconventional warfare (GW/UW) and its unique medical support. Indigenous guerrilla force members served as medics, frequently as a part time duty, and due to where these conflicts raged, most have not spoken English. When they were in a position to write, after they won, former guerrillas mostly wrote of combat tactics and techniques, not logistics and medicine. Many of the references used in exploring the World War II lessons learned are contained in the literature discussed in that article.[1] This article is the first of a series that will cover the military doctrinal literature available for similar study. The series will primarily focus on Army doctrine as it is the vast portion, but will highlight Air Force, Navy, and Marine doctrine when available. This article will review the first manuals and directives published in the post-World War II, early cold war period.

Two famous, unreferenced, and only partially tongue in cheek, quotes on the American Army concerning its grasp and use of doctrine:

"The reason the American Army does so well in wartime is that war is chaos and the American Army practices chaos on a daily basis."[2]

"One of the serious problems in planning against American doctrine is that the Americans do not read their manuals nor do they feel any obligations to follow their doctrine."[3]

These quotes notwithstanding, various authors have put forth the thesis that the American Army's grasp of doctrine and its collection of doctrinal writings before and during World War II made it much more effective in combined arms warfare than the British Army. The Army's method to communicate the need for rapid change through its dense network of bureaucracy to the troop leaders was its mechanism of field manuals and doctrine. Subsequent to the war, American doctrine writing became even more robust.[4]

With that as background perspective, and with a very large thank you to Lieutenant Colonel Greg E. Metzger, Special Forces, U.S. Army, the pre-

eminent doctrinal theorist in today's Army Special Forces,[5] this series of articles will start a chronological look at GW/UW military doctrinal publishing and its inherent medical support doctrine from World War II to the present day. Early American unconventional warfare military manuals and doctrine, a very specialized governmental literature, is the subject of this article.

At the end of World War II, the allies began to document much of the British-American-French doctrine on special operations, formulated and practiced by the American Office of Strategic Services (OSS) and the British Special Operations Executive (SOE). Some of the ground operators of the OSS were physicians and dentists.[6] The victorious allies held various conferences to dissect and explore all wartime missions. This included guerrilla warfare medical aspects with various meetings, conferences, proceedings, and journal articles. Thus, among others, Major Colin Dafoe, Commander of a Canadian Forward Surgical Team,[7] one of several teams that the allies inserted by parachute or by amphibious landing into Yugoslavia to support Tito's guerrillas, spoke at an allied conference on war medicine about his experiences.[8] The American Army began and continues to publish articles and manuals on guerrilla warfare, auxiliaries, counterinsurgency, and to a very limited degree, medical support of these operations.[9] The manuals have been refined, changed, and updated to the present, both unclassified and classified, and not always for the better.

The overriding theme from the published literature on guerrilla movements of World War II was that a successful guerrilla movement must have a medical service. Numerous authors, including senior combat commanders, commented on the intimate link between guerrilla warfare and medical care and evacuation, as in Marshall Tito's comment:

"…our operations were closely linked with our wounded, who were always numerous, so that it was not possible to avoid encirclement…."[10]

From Colonel Aaron Bank, founder of Special Forces, once a Jedburgh Team OSS officer:

"The individual guerrilla would perform his battle duties with more ardor and spirit and accept more risks if he knew that there was medical support in case he became a casualty."[11]

Another theme from World War II is two dramatically different systems of hospitalization. There is the Yugoslavian system of Marshal Tito favoring larger, more isolated, facilities, discussed by Colonel Djorde Dragić (Tito's Chief Surgeon) in his book *"Partisan Hospitals in Yugoslavia 1941-1945.*[12] The French Maqui system favored smaller, more decentralized, facilities, as they were more clandestine for their environment. This need for and development of the French system is briefly discussed in Colonel Aaron Bank's book *"From OSS to Green Berets. The Birth of Special Forces."*[13] These medical systems contrasted with the failure in the Philippines to develop similar medical systems in the disease-infested jungles. Multiple books document the medical failings in that theater – one in which the OSS did not control all special operations.[14] The recently published official history of the Army Medical Department in the war against Japan has a chapter on medical support to guerillas in the Philippines.[15]

In 1947, the Department of State (DOS) forwarded a proposal to the Joint Chiefs of Staff (JCS) pointing out that America did not equal the Soviets in guerrilla warfare expertise and recommended that the military should found a guerrilla warfare school and have dedicated forces for this. This proposal was from two long time DOS personnel, Charles Thayer and Franklin Lindsay, who had worked in Yugoslavia with the partisans. In the DOS endorsement to the Secretary of Defense, George Kennan, the principal DOS architect of our Cold War Soviet policies stated:

I think we have to face the fact that Russian successes have been gained in many areas by irregular and underground methods. I do not think the American people would ever approve of policies which rely fundamentally on similar methods for their effectiveness. I do feel, however, that there are cases where it might be essential to our security to fight fire with fire.

As the JSC studied this request they decided that the U.S. military should have the ability to support local resistance groups and that in peacetime this mission should be done by the CIA. That further led to a recommendation to not establish a guerrilla school or unit. They further stated that existing schools could train the personnel needed to be *"on call for introduction into countries to organize, direct and lead native guerrillas."*[16]

This phrase *"organize, direct and lead native guerrillas"* sounds very similar to the historical and current Special Forces mission of *"organize, train and equip indigenous forces."* It is slightly rephrased in a

current capstone field manual as *"to advise, train, and assist indigenous military and paramilitary forces."*[17]

Several of the leading American practitioners of GW/UW during World War II, Colonels Aaron Bank, Edward Lansdale, and especially Russell W. Volckmann, played a large part in writing the first post-World War II manuals, supplying their wartime experiences to the early doctrine as the army reinvented this old type of warfare, war that, in the words of President Kennedy:


BG Russell W. Volckmann

"…is another type of war, new in its intensity, ancient in its origins…"[18]

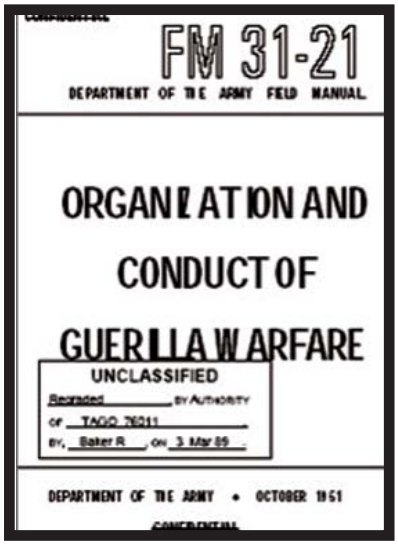
1950: Army Special Regulation 350-5-1

The initial post-war guerrilla warfare mention by the Army was in Special Regulation 350-5-1, issued in 1950. The Army promulgated it relatively shortly after the disbanding of the OSS, the creation of the Central Intelligence Agency (CIA), and at a time when the Army was without any dedicated units to perform unconventional warfare. They would not establish Special Forces groups until 1952. The president made the decision that the CIA would be the peacetime purveyor of guerrilla war, if ever required, and that the Army would only concentrate on wartime operations. This regulation, a manual of Army terms, defined Partisan Warfare as *"Activity carried on against an enemy by people who are devoted adherents to a cause, but who are not members of organized and recognized military forces. It includes guerrilla action, passive resistance by underground groups, espionage, sabotage, and propaganda."*[19] This verbiage tends to infer that they envisioned this as a type of warfare that enemies did to U.S. forces, not something that the Department of Defense expected U.S forces to perform as a mission or as a developed standing American Army capability.

Various groups left over from World War II guerrilla movements dotted the landscape at this time and numerous wars of national liberation had begun under communist support to indigenous, native guerrilla movements, primarily in colonial possessions of the World War II allies. At the close of the war, groups of guerrilla fighters who had been opposing the Germans, the Soviets, or both, still existed. As Soviet forces quickly occupied Eastern Europe, these organizations, primarily in Albania, Romania, Ukraine, Hungary, Poland, and some even within the Soviet Union, shifted from guerrilla warfare to espionage, subversion, and sabotage. The United States looked upon these groups as possible allies against the Soviets and the CIA spent considerable time, effort, and money in keeping contact with these eastern European groups. Both the United States and the Soviet Union secretly started to mobilize forces against each other and building intricate networks of spies and unconventional warriors. Guerrilla warfare became a proxy war of the cold war, much preferable to nuclear confrontation. A secret American plan known as Rollback was *"an audacious strategy of espionage, subversion, and sabotage to foment insurrection in the Soviet satellite countries."*[20] The CIA stood ready to aid these homegrown groups of anti-Communists. The SR 350-5-1 doctrine clearly saw guerrilla warfare as something to be used by the western allies against the Soviets with indigenous forces, the beginnings of "through, with, and by."[21]

1951: Army Field Manual (FM) 31-21, Organization and Conduct of Guerrilla Warfare —Doctrine

The very next year, October 1951, brought Colonel Russell W. Volckmann's efforts[22] to completion in the form of Army FM 31-21, Organization and Conduct of Guerrilla Warfare. It defined guerrilla warfare as: *"operations carried out by small independent forces, generally in the rear of the enemy, with the objective of harassing, delaying and disrupting military operations of the enemy. The term is sometimes limited to the military operations and tactics of small forces whose objective is to inflict causalities and damage upon the enemy rather than to seize or defend terrain; these operations are characterized by the extensive use of surprise and the emphasis on avoidance of causalities. The term ... includes*



organized and directed passive resistance, espionage, assassination, sabotage and propaganda, and, in some cases, ordinary combat. Guerrilla warfare is ordinarily carried on by irregular or partisan forces; however, regular forces which have been cut off behind enemy lines or which have infiltrated into the enemy rear areas may use guerrilla tactics."[23]

The number, 31-21, assigned to this FM had been previously used in 1941 for Jungle Operations, a manual largely based on America's Philippine experience.[24] The Army classified the manual as confidential when issued and it remained so until 3 March 1989. It firmly states that guerrilla warfare could be the mission of regular army forces, forecasting the development of Special Forces units the following year.

The manual's first section gives a concise, thoughtful, history of both the European and the Pacific theaters of war in World War II, the extent of unconventional forces in each theater, and the role that they played in the winning war effort. It then discusses the emerging threats from guerrilla groups, primarily communist, since the end of the war, citing multiple examples. It mentions the communists in France and Italy who kept the faithful engaged but not in an actual struggle by stockpiling arms and using "ex-partisan" associations. In the Philippines, communist-inspired Huks were operating against the American-friendly government. In Greece a successful campaign to oust a communist guerrilla enemy was just over.[25] Indonesia had used guerrilla tactics to recently oust the Dutch colonial power. Malaya was in an ongoing struggle with the British. In Indochina, the Viet Minh were fighting the French and in Burma, various hill tribes that fought against the Japanese during the war (with OSS help) were effectively resisting efforts of the Burmese government to bring them under control.[26]

1951: Army Field Manual 31-21, Organization and Conduct of Guerrilla Warfare — Medical Doctrine

Under a Medical Service section, this manual states, *"The guerilla area commander is responsible for the medical service within his command. The plan for medical treatment, evacuation, and hospitalization is prepared by the chief surgeon in close coordination with the operations section of the area command staff."*

It further details:

"a. Prompt and efficient evacuation and treatment of casualties in guerilla operations is important for the following reasons:

(1) Guerilla forces are generally small; they are also specially trained and highly efficient. Their success is determined by losses they inflict upon the enemy with the least number of losses to themselves. Prompt evacuation of wounded and efficient medical treatment will reduce these losses.

(2) The success of an operation may hinge on the efficient evacuation of casualties. Any casualty falling into enemy hands becomes a possible intelligence leak, which may jeopardize the security of the entire guerilla force. The success of a guerilla action, therefore, can be evaluated only after every man is physically accounted for.

b. The execution of the medical plan is decentralized as far as possible to the district and even to the individual force commanders. This is done to allow small unit commanders to meet sudden and unexpected local reverses. The degree of decentralization is influenced by the following factors:

(1) Facilities available to the area command that facilitate decentralization, for example, transportation, medical supplies and equipment, and qualified personnel.

(2) The enemy situation.

(3) Medical support from theater special forces.

(4) Availability of supply from civilian sources.

(5) Existence of secure hospital centers.

(6) Existence of evacuation means."[27]

This guidance strongly mirrors the medical capabilities seen in guerrilla movements of World War II. In general, they had robust medical services to enhance morale, conducted evacuations, received supplies from theater sources, and had secure hospitals. Both the Yugoslavian and the Ukrainian literature express worries about casualties being intelligence leaks and the ability of the enemy to follow casualties to treatment locations.[28] The term theater special forces refers to the proposed higher headquarters organization developed by the manual. It showed in two figures (see manual's figure 1), a Special Forces theater command in an equal level with army, navy, and air components. It further stated: *"23. THEATER ORGANIZATION. a. The theater commander may organize a theater Special Forces command on the same level as the theater army, navy, and air (figure 1). Close liaison and coordination is established between the theater Special Forces and the other theater forces. All units engaged in special forces operations and responsible to the theater commander are assigned to the special forces command.*

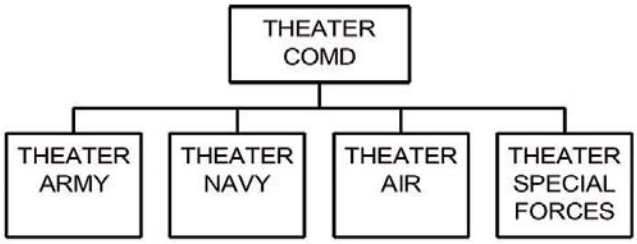


Figure 1. Theater Special Forces Command organized on the same leavel as theater Army, Navy, and Air

All units engaged in Special Forces operations within the theater, but responsible to headquarters other than the theater headquarters, are attached to the theater Special Forces Command for coordination and logistical and administrative support."[29] This need is reflected in today's joint publications.

This debate on whether or not Special Forces needs to be co-equal with other theater service components continues to this day. The current doctrine calls for Special Operations Forces to be a separate command, but the doctrine is not universally followed at present. This continues to have a large effect on medical operations as the senior Special Forces or special operations surgeon may or may not get a seat at the theater medical table depending on whether his commander gets a seat at the major commanders' table. This theater level access is key to making the theater evacuation system flexible enough to meet the needs of far flung Special Operations Forces.[30]

Use of civilian hospitals and other such medical facilities, which Colonel Aaron Bank had deemed a problem in France,[31] was discouraged: *"Guerilla forces may utilize existing civilian medical installations. This should be done only in extreme emergency or in areas where the enemy lacks effective control. The loyalty of the civilians within the area, particularly those of the medical installation, must be unquestionable."* This came from the experiences of the allied OSS/OSE teams who saw Gestapo sweeps of local hospitals searching for their resistance fighters in occupied Europe.

In lieu of using local hospitals close to the battle space, the doctrinal guidance was to replicate the systems used in the European theater of war*: "The area commander's plan may include the establishment of small covert hospital stations attended by loyal members of an otherwise questionable hospital. Loyal personnel from hospitals operating in insecure areas may be used to smuggle needed medical supplies to the guerillas. Doctors, nurses, and technical personnel are recruited from the local population. Such personnel may be supplemented by trained personnel infiltrated from regular forces. Additional personnel, recruited locally, are trained to carry out nontechnical duties."*[32]

The field manual also encouraged use of auxiliaries, an important part of both the French and Yugoslav movements: *"Locally organized civilian first-aid units are used to supplement guerilla medical personnel and units. Civilian units are trained in first aid, and they establish emergency-aid stations within their communities. These units are incorporated into the medical plan of the area and district commanders. Unlike regular army medical units, these stations are not mobile, do not follow the units supported, and must be ready to provide care for the wounded for long periods. They must be able to hold and conceal their casualties until they can be moved to other accommodations."*[33] This decentralized care for casualties, with the circuit riding medical officer, was most evident in occupied France with the Maqui and the Jedburgh Teams. It requires an organized auxiliary which takes time.

Medical supply was and continues to be a huge issue in all guerrilla movements. In World War II guerrillas, especially with the Russian and Yugoslav partisans, staged specific medical raids to obtain sufficient quantities of pharmaceuticals and medical supplies.[34] The manual states that supplies:

"a. ...are of great importance in all guerilla operations. Normally they are scarce and difficult to procure. They are obtained from three principal sources:

(1) Local improvisation and manufacture.

(2) Enemy sources.

(3) Outside supply from theater special forces.

b. Supply from outside sources will not interfere with the shipment of other supplies, as most drugs have little bulk or weight. Raw materials for surgical dressings may be delivered in bulk."[35] (see manual's figure 4)

Several of the well-organized guerrilla movements had large manufacturing centers for medical supplies according to the Yugoslav and the Ukrainian writings.[36]

An early glimpse into the ever-growing mission of training indigenous medics by Special Forces Medical Sergeants is hinted at by the guidance provided for prototype organizations and functions of a guerilla medical unit (see manual's figure 11):

"a. When a guerilla force becomes large enough it organizes its own medical support. Plans for each guerilla operation should provide for one or more men whose duty is to carry medical supplies and provide first aid. One aid man is provided for every 50 men

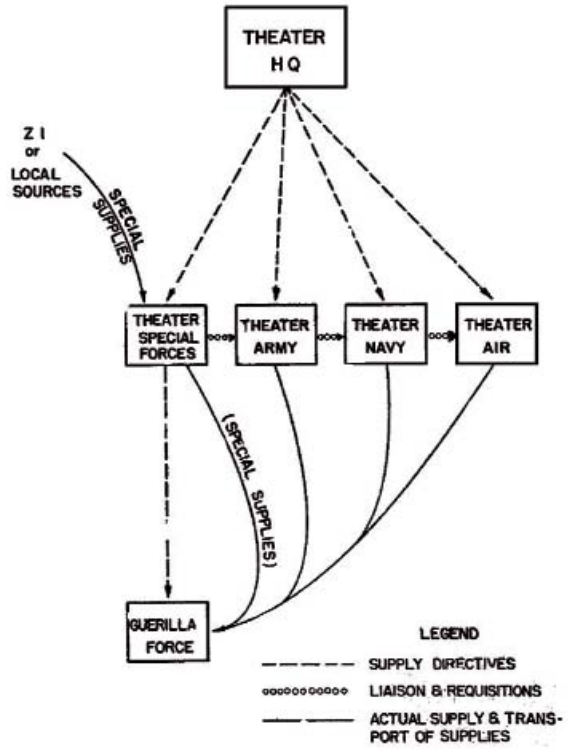


Figure 4. Initial supply of guerilla force by theather Special Forces.

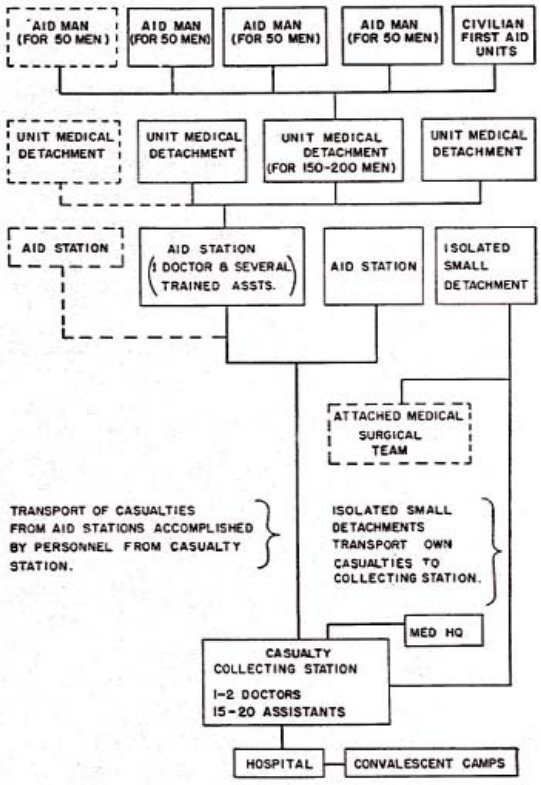


Figure 11. Typical guerilla medical organization.

unless the operation is very small and an aid man is unnecessary. With a force of 150 men or more, which requires 3 or 4 aid men, at least one aid man should be an experienced technician.

b. Two or more forces require a medical aid station under the control of competent medical personnel. Such an aid station is capable of fulfilling… three or four 200-man units operating in a given area. It consists of a doctor and several trained assistants who may be augmented by special personnel when the situation demands. It is similar to a standard aid station for a regular infantry battalion. There are, however, these differences:

(1) There may be no need for a litter bearer section. Guerilla actions are usually short, and the guerillas are usually able to transport their own casualties after first aid has been given.

(2) The aid station must be prepared to conceal and transport casualties from the scene of action, and to continue treatment at some covert location until the situation permits evacuation to a more distant point.

(3) In guerilla warfare there is no army rear area in which casualties may be promptly evacuated. It is important, therefore, that surgical aid be given on the spot, probably at the aid station.

(4) Casualty-producing actions may be part of a covert operation, and casualties may have to be hidden and cared for close to the scene of the operation.

c. Small forces operating separately may temporarily augment their medical force with surgical or medical teams procured locally. These are not stationed necessarily at the scene of action, but may be stationed at some relatively secure spot to which casualties may be removed.

d. Each two to four aid stations have a central casualty collecting station. Such a station may sometimes be required to support a single aid station. A collecting station is similar to the standard regimental collecting station. It is provided with personnel to move casualties from aid stations and other concealed points to guerilla controlled territory and to provide adequate care en route. It may be augmented by temporary medical or surgical teams. At least one officer at the collecting station should be familiar with the condition, transportability, and location of casualties and should know the plans and structure of the guerilla unit. He will be the counterpart of a regimental surgeon, but because of his command and tactical responsibilities, he need not be a professional physician or surgeon.

e. Up to this point the receiving, care, sorting, and evacuation of casualties is a unit responsibility much the same as it is in a standard infantry regiment. If secure guerilla hospital units exist, hospitalized patients should be moved from aid and collecting stations as soon as possible so the stations will be clear to receive new casualties. It is necessary, however, that this evacuation be made by personnel under the control of the guerilla area staff, with adequate coordination and secrecy. Evacuation must be secure and rigidly controlled."[37]

The comments about secure evacuation most probably stem from the immense difficulties the Yugoslavs had with their casualties as discussed in Dragic's book, *Partisan Hospitals in Yugoslavia 1941-1945*.[38] Note the term "aid man." What is now a Special Forces Medical Sergeant began as a Special Forces Medical Aid Man. The mention of surgical capability "on the spot" may relate to the experiences of the allied forward surgical teams inserted into Yugoslavia to support Tito, one Canadian (Colin Dafoe)[39] and one from New Zealand (Lindsay Rogers).[40] Other comments in the field manual concerning surgery:

"In guerilla warfare, much of the emergency surgery, ordinarily performed at regular hospitals, is done in the field at aid stations and collecting stations."[41]

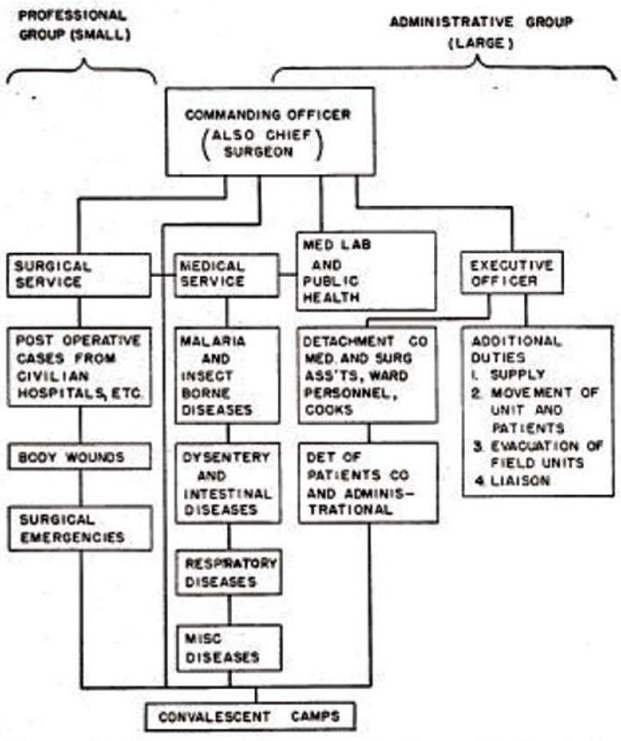


Figure 12. Functional chart of typical guerilla hospital.

The section on evacuation infers the need for "secure guerrilla hospitals." See manual's figure 12.

Discussed in the section on hospitals:

"a. It is not expected that hospitals will be elaborately equipped or manned entirely by highly skilled personnel. Items like X-ray apparatus, pressure sterilizers, and refrigerators for blood banks are immobile and difficult to obtain. Therefore, hospitals should have a small nucleus of highly trained personnel and a large overhead of ordinary personnel for handling the average convalescent patient. Equipment will consist chiefly of dressing material, essential drugs, and those housekeeping items necessary to keep a patient comfortable until he can be transferred to a convalescent camp.

b. Whenever possible, casualties suffering from severe wounds and injuries, such as shot and shell fragment wounds, are treated covertly at civilian institutions possessing equipment and staffs until such time as the casualties may be moved to a guerilla hospital. Severe wounds of this type are not common in guerilla actions, most wounds being received from small arms.

c. Following is a description of the hospital organization of a guerilla command:

(1) Each hospital consists primarily of a small professional nucleus and a large group of semiprofessional personnel. The senior professional member of the hospital commands it. His principal staff officer or executive keeps in close coordination with the plans of the area command, including the plans of the chief surgeon. Because of his command administrative responsibilities he need not be a professional physician or surgeon.

(2) In general, the hospital structure of the guerilla command will more closely resemble the organization of a holding company of the regular forces than it will resemble a regular hospital. It will be augmented by whatever personnel are available. In guerilla warfare, much of the emergency surgery, ordinarily performed at regular hospitals, is done in the field at aid stations and collecting stations.

(3) As there is no possibility of evacuation of the average medical case to a rear area, a local hospital provides care for all routine diseases, including epidemic diseases. An adequate medical laboratory is small and compact and easily moved. It requires few personnel but an adequate medical supply is essential. Medical patients suffering from ordinary diseases are usually easily transported in case a hospital must be moved.

d. Small mobile hospitals may be organized by the area command and located in district commands on an attached basis. These hospitals are located in secure areas. Two or more alternate sites are prepared for each hospital. If the principal site becomes compromised or is threatened by the enemy, the hospital is moved to an alternate prepared site. The beds are so constructed that they serve as stretchers on which the patients are evacuated when a move is ordered.

e. When it becomes both practicable and desirable to centralize hospital facilities, a number of small mobile hospitals may be combined and reorganized to form a large area hospital. This centralization presupposes good security and contemplates bringing the casualty care completely under the control of the guerilla force. Centralized hospitals will need logistical support from regular forces.

f. A typical guerilla hospital unit is illustrated in figure 12, but it is impossible to set a standard because available resources, security, and bed requirements all affect the organization. It will be noted that the surgical requirements are reduced to the minimum. This permits maximum utilization of surgical personnel in outside installations on an emergency basis."[42]

This system of relatively sophisticated underground (sometimes literally) hospitals in guerrilla organizations of World War II influenced the senior officers writing these doctrinal points. They considered an organized medical service to be a morale booster, a force multiplier, and a requirement, however labor intensive, of a successful guerrilla movement. They recommended a large work force expense for this vital service. Clearly, the need for a large auxiliary force of willing civilians is essential to perform these services. The Yugoslavs in particular used young girls for medical supply carriers, unsearched through German roadblocks, and as nurses.[43] *This doctrine of a large medical footprint will be the most controversial and most changed from manual to manual as doctrine progresses over the decades. The requirement for success to recruit an auxiliary to support medical services, means that the shorter the war, the smaller the medical support. The medical support was small to nil for the organized guerrilla force fighting in Afghanistan's recent, very short, American unconventional war in 2001.* The final section of the medical service portion discusses convalescent camps.

"Convalescent patients may be released from hospital control and be temporarily established in convalescent camps. These camps may vary in size and facilities according to the demand, supplies, and security. A four-man camp may be established under the supervision of a convalescent company aid man in the field near a source of water. A larger camp may be dispersed in a village. Convalescent camps come under the command of the hospital command structure in the area. They are useful for increasing the capacity of local hospital facilities, but require considerable administrative and logistical control. This is best done by the hospital last having jurisdiction over the patient. Convalescent camps are attached for rations and security to the unit in whose area they are located."[44]

If the guerrilla force were to expend the effort to have a large evacuation and hospitalization system, then it would want the force provider effects of returning skilled fighters to the fight in addition to the morale effects of providing combat health care. Convalescent care was required to complete the cycle.

In summary, FM 31-21 lays out detailed guidance for GW/UW and its medicine, capitalizing on the successes of World War II operations in a level of detail and clarity that will be lacking in some later manuals.

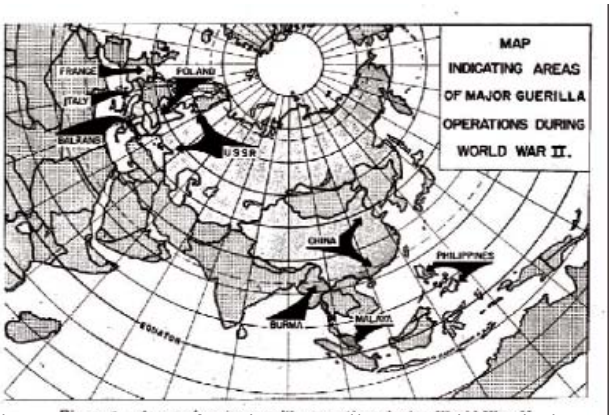
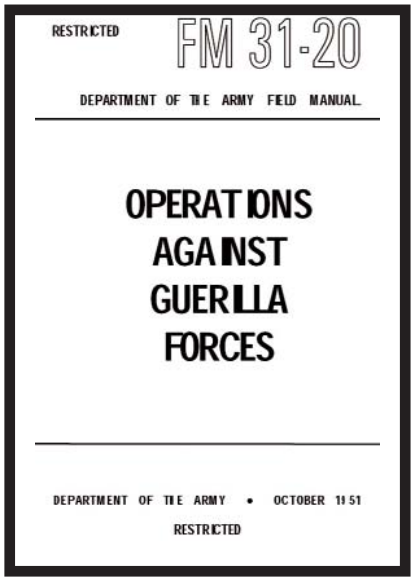


Figure 5. Areas of major guerrlla operations during WWII.

1951: Field Manual 31-20, Operations Against Guerilla Forces — Doctrine

FM 31-20, Operations Against Guerilla Forces, the companion manual to FM 31-21, was published earlier the same year. Its classification was only restricted distribution as opposed to the confidential nature of FM 31-21. The manual's definition of guerrilla warfare is most interesting:


RESTRICTED

FM 31-20

DEPARTMENT OF THE ARMY FIELD MANUAL

OPERATIONS AGAINST GUERILLA FORCES

DEPARTMENT OF THE ARMY • OCTOBER 1951

RESTRICTED

"Guerilla warfare is one of the oldest methods of waging war. Throughout the ages it has contributed to the victory and defeat of nations. It forms an important part of the strategy and tactics of many modern powers. A knowledge of guerilla warfare and the means of combating guerillas is therefore necessary. The term "guerilla warfare" is used loosely to describe all kinds of irregular warfare. It is generally associated with broad movements that may be briefly described as

a. A people's war or revolution against existing authority

b. A war conducted by irregular forces (supported by an external power) to bring about a change in the social political order of a country without engaging it in a formal, declared war.

c. A war conducted by irregular forces in conjunction with regularly organized forces as a phase of a normal war.

d. Operations, generally of short duration, conducted by detached regular forces in the enemy's rear areas. This manual is concerned primarily with the type of guerilla warfare described in b and c above."[45]

This shows the continued orientation in those pre-Special Forces Group days (one short year away) of doctrine supporting guerrilla warfare only as part of a larger, conventional war or as something done by completely indigenous forces with only supply and other physical assistance provided by outside forces. No organic army unit had guerrilla warfare as an assigned mission. The field manual shows an excellent map (figure 5) of World War II areas of guerrilla activity.

1951: Field Manual 31-20, Operations Against Guerilla Forces — Medical Doctrine

This counter insurgency manual, describes a guerrilla medical service:

a. Medical support in guerilla warfare is often nonexistent. Lack of evacuation facilities, hospitals, medical supplies, and trained personnel may preclude the organization of adequate medical support. Guerillas may use existing civilian facilities to care for their sick and wounded, in which case the patients pose as civilians while under-going treatment. On the other hand, guerilla organizations have been known to develop highly effective medical supporting units and installations. Their organizations have paralleled those of the regular forces and have included field hospitals located in inaccessible areas. They have recruited doctors, nurses, and technical personnel from local civilians, and have obtained medical supplies from the local populace, from raids, and from external sources.

b. Guerilla forces normally do not need the same medical support provided regular forces. Most guerilla operations result in relatively few casualties. Employing surprise and mobility, and basing their operations on excellent intelligence, the guerillas strike weakly defended objectives or an enemy who is unprepared to offer resistance. However, this advantage is offset to some extent by increased sickness and infections resulting from exposure to the elements and inadequate diet.

c. When guerilla forces are committed to operations approaching normal warfare, their casualties increase and they need more medical support. Generally, when so committed, the proximity of regular allied forces and increased outside logistical support take care of this need.

These medical comments again show lessons learned from World War II. The Yugoslavian guerrillas experienced very high casualties after they decisively engaged the Germans. Via supply aircraft backhaul, some nights over a thousand casualties were evacuated to allied hospitals in Italy. These patients had many diseases that would manifest themselves after the received better nutrition and treatment for their wounds.[46]

Conclusions

Early 1950s, pre-Special Forces, doctrinal guidance and field manuals show an American Army not equipped to perform a guerrilla warfare mission, with no dedicated forces for that mission. It stood

ready to supply and assist an indigenous force as part of a larger war. These doctrinal manuals do show multiple medical lessons learned from the World War II guerrilla operations by the allied powers. They include:

> Guerrilla organizations should exert the necessary work force to have a sophisticated medical service to motivate fighters.
>
> Successful guerrilla medical organizations require an auxiliary force.
>
> Far forward surgical care is required.
>
> Guerrillas should avoid treatment at civilian hospitals.
>
> Partisan hospital organization and size depends on the tactical situation.
>
> Medical supplies are always in short supply, although some may be manufactured in the guerrilla warfare operational area.
>
> Casualties may be an intelligence risk if captured.
>
> Special Operations and Special Operations medical presence at theater level is required for success.
>
> Theater level control and support of guerrilla forces is required, especially for medical supply and perhaps for surgical and evacuation support.

These early post-war doctrinal manuals clearly delineated the World War II experiences and set the stage for the arrival of the Special Forces Groups and the writing of a capabilities document for the employment of Army Special Forces. It shows the hands of World War II guerrilla ground commanders. A future article will show how the revisions of these doctrinal manuals incorporated Special Forces unit organization, tactics, and techniques into American Army doctrine.

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Combat Ophthalmology When There Isn't an Assigned Ophthalmologist

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Dean E. Vavra, MS, CEBT
Frank Butler, MD

ABSTRACT:

The National Guard has extensive capabilities that are impossible to attain in active duty units, largely because its citizen Soldiers bring their civilian expertise in addition to their military occupational specialties. While deploying to Afghanistan as the flight surgeon for a forward deployed Special Forces (SF) battalion, this Colorado Army National Guardsman also provided basic ophthalmology care in theater in the absence of an assigned ophthalmologist. The SF Battalion Preventive Medicine (PM) NCO was also an experienced eye technician in civilian life. Emergency eye surgery was provided for allied, coalition, and host nationals in accordance with the Rules of Engagement. Elective eye surgery was an excellent method to build rapport and trust in keeping with the Special Forces "winning the hearts and minds" philosophy. Editor's Note: First person references in the article refer to the primary author, COL Enzenauer.

In 2002 I deployed to Afghanistan as the flight surgeon with the Special Forces battalion of the Army National Guard (ARNG) in support of Operation Enduring Freedom. It was during this time that Operation Iraqi Freedom kicked off, and there was currently no assigned military ophthalmologist in Afghanistan. Current doctrine for "Health Service Support in Joint Operations" is governed by Joint Pub 4-02 (Image 1). Five echelons of medical support are recognized, and specialty eye surgery is normally provided at Level III and higher military treatment facilities (Image 2). Increasingly sophisticated surgical capability is being pushed "forward" with the Forward Surgical Teams in the overall health services support plan (Image 3). However, with the advent of neuro-imaging and specifically MRI (magnetic resonance imaging), the deployment of ophthalmologists in combat support has been in the form of "Hospital Augmentation Teams, Head and Neck" and "Eye Surgical Teams" and will normally

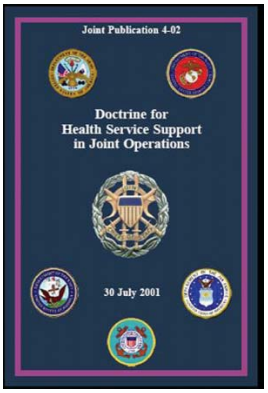

Image 1

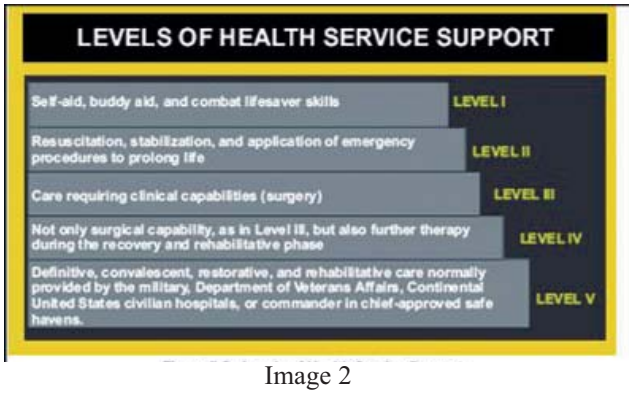

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Image 3

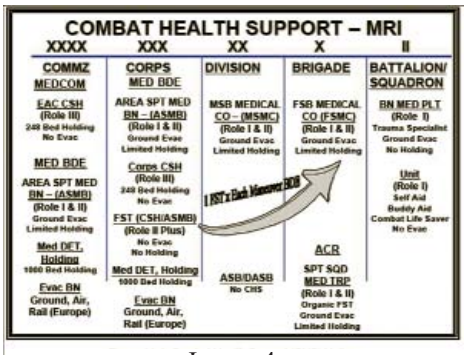


Image 4

follow the MRI machine. (Image 4) Everyone in uniform should be aware that as the U.S. military "down-sized" in the 1990's after Operation Desert Storm from 18 combat divisions to 10 army divisions, the medical support was also reduced proportionately. The U.S. Army went from training as many as 12 ophthalmologists per year in the early 1980's to only six ophthalmologists annually in 2002. Very few trained ophthalmologists without a military service obligation "wake up" and join the U.S. Army Medical Department after their training. After initial combat operations were completed in Operation Enduring Freedom (OEF), Afghanistan quickly evolved into a "relatively" safe combat zone. When the first Combat Support Hospital (CSH) rotated home, the replacement unit did not have an ophthalmologist. An ophthalmologist did not deploy with either the "head and neck team" or the "eye surgical team." With the end of significant combat operations, eye surgery was not anticipated, and an optometrist provided eye care in the theater of operations.

However, the absence of a qualified ophthalmologist in theater along with the Rules of Engagement (ROE) put the CSH in a bind regarding emergency medical support. Almost 10 million Russian mines left in Afghanistan demanded the availability of emergency ophthalmologic care. During the military operations, MEDCAPs (Medical Civic Action Programs) were performed by the medical units and Special Forces units, providing limited "primary" care for the host nation (HN). The ROE normally covered emergency care for anyone in the theater of operations, including host nation personnel, for "life, limb, or eyesight" threatening injuries, and that was literally impossible with no "vision-saving" surgical capability in Afghanistan. The CSH Commander in Bagram was a general surgeon who was a friend and colleague from Fitzsimons Army Medical Center two decades earlier. The CSH had an assigned oral-maxillofacial (OMF) surgeon and an ear, nose, and throat (ENT) surgeon, and the operating room had a general plastic surgery set, an ENT set, and an OMF set. The CSH had a 20-year-old Wild operating microscope without a focusing pedal. Since there was not an "assigned" ophthalmologist, there were no ophthalmic sets. There were 40 to 45 miles of "bad road" between the CSH and the SF Forward Operating Base (FOB) (Image 5). It quickly became obvious that the CSH commander looked upon me as his "eye surgeon" in theater, and I was

Image 5

called upon almost weekly to provide emergency eye surgery for both injured host nation patients and coalition forces.

The Colorado ARNG SF battalion deployed to the FOB and in support of a Foreign Internal Defense (FID) mission was involved in training the fledgling Afghan National Army. The robust medical section included two physicians (one ophthalmologist-pediatrician and one family physician-ER physician), two physician assistants (PAs) (both former 18 series, one practicing orthopedic PA and one neurosurgical PA), an experienced dentist, and a senior 18Z (a combat infantryman in Vietnam who in

Image 6

civilian life worked as a CCU RN) (Image 6). The assigned 91S preventive medicine NCO was employed as a certified eye bank technician in civilian life, and had served previously with me as a military ophthalmic technician at Fitzsimons Army Medical Center. We had literally performed hundreds of eye surgeries together on active duty.

We were heavily involved in the routine medical operations of the SF battalion. In support of the unit's FID mission and in response to direction from higher headquarters in country, the SF medical section planned for eight MEDCAPs and actually completed six during the seven months in Afghanistan. After completion of basic training by

Image 7

the Afghan National Army, units continued training with the Operational Detachments A (ODAs) and often provided security for the local Medical Civic Action Programs (MEDCAPs) as part of some of the earliest confidence-building missions (Image 7). These security operations in support of the MEDCAPs also helped provide legitimacy for the Afghan National Army early on with the local populace. Fortunately, the majority of the children examined during the MEDCAPs were healthy.

After 20 years of conflict with the Russians, and 10 years of oppression by the Taliban, the medical services available in Afghanistan are very limited. For example, there was no capability for neurosurgery in Kabul, and no oncology services. However, the trauma surgeons were experts in their ability to deal with multiple traumas. There is a very good ophthalmologic surgical facility (the Noor Eye Hospital) that is funded by private charity, and is affiliated with the Kabul Medical University. However, the Noor Eye Hospital is really only equipped to provide basic cataract surgery and less commonly, simple strabismus repair.

I suspected that I might be "recruited" to provide some level of eye care during my deployment so before leaving CONUS I tried unsuccessfully to requisition a "division optometry set" which includes a slit lamp, phoropter, chair, etc.. However, I was not allowed to sign out a division optometry set since an SF battalion was not assigned an optometrist. It became quickly apparent that I needed some basic ophthalmologic equipment. Through the generous support of two former military ophthalmologists, colleagues from the now closed Fitzsimons Army Medical Center in Colorado (Dr. Will Waterhouse, a retina specialist, and Dr. Stu Farris, a oculoplastics specialist) the Colorado Army National Guard "eye service" (or the Tennessee Volunteer Medical Center in Image 6) was equipped so that I could provide reasonable ophthalmologic care in the absence of a designated, assigned ophthalmologist. Drs. Waterhouse and Farris mailed an indirect ophthalmoscope with lenses, a simple "instrument set" with forceps, scissors, specula, ophthalmic suture (6-0 and 8-0 vicryl along with 9-0 and 10-0 nylon), a Simcoe I/A (irrigation/aspiration) device, and Wek® cell sponges.

When time was available, emergency eye consultations were performed for the International Security Assistance Forces (ISAF) hospital located literally across the road from the FOB. Among those cared for were several injured coalition soldiers who presented with non-combat related ocular trauma; a foreign ambassador serving in his embassy who had glaucoma and cataracts which had been treated before at the Moorfields Eye Hospital in London. Emergency eye care for two of our own ARNG SF Soldiers who were injured from an improvised explosive device (IED) thrown into their vehicle was provided. Also cared for were many injured Afghan civilians who sustained eye injuries in conjunction with other trauma; most commonly, a result of accidental explosions of 20-year-old Russian mines. The SF Soldiers were excellent sources of referrals, often finding children with untreated strabismus in the villages near their Area Operating Base (AOB) when working with deployed Afghan National Army units. I examined many visually impaired individuals who presented at the gates when the announcement was made on the local radio (much to my chagrin) that there was an American eye doctor "at the army base."

Most eye emergencies involved injured Afghan civilians, predominantly children. Typically I was presented with an injured child who was nearby a fatally-injured child who had set off a mine. Of most pressing concern was the prevention of sympathetic ophthalmia, which is an auto-immune disease that can result in blinding uveitis in the uninjured eye. Severe ocular trauma with a ruptured globe basically exposes the injured person's immune system to retinal-S antigens which can potentially result in the vision-threatening antibodies and blinding intraocular inflammation. Sympathetic ophthalmia (SO) is virtually 100% preventable if the injured eye is removed within two weeks of the trauma. There is a theoretical risk of sympathetic ophthalmia developing in a patient where a simple evisceration is performed rather than a total enucleation. However, sympathetic ophthalmia is a rare occurrence even in patients with severe eye trauma, and several large series have not documented SO in patients treated with evisceration. My recommendation is that it should be consid-

ered over enucleation when intraocular tumor is not an issue and scleral volume is adequate.

A simple evisceration involves removal of the ocular contents but retention of the scleral shell. Ocular evisceration can be performed if necessary under local anesthesia with sedation. An enucleation involves removal of the entire eye, and can be performed with or without isolating the extraocular rectus muscles. An enucleation is generally performed under general anesthesia. In my experience, the decision to perform an enucleation rather than an evisceration was generally made because of severe damage to the eye that made preservation of the scleral shell impossible. Similarly, a severely infected eye, often after intraocular surgery in third world countries, would generally require enucleation without implantation of a sphere and simple granulation.

The majority of patients who presented because of injured eyes beyond hope for recovery of vision were still appropriate candidates for evisceration. It would generally take a week or so for these patients to get to the U.S. military hospital in Bagram. These patients most often had a ruptured globe with a retained intraocular foreign body, total retinal detachment, no light perception vision and no prospect for repair in Afghanistan. In these cases, evisceration or less commonly enucleation was performed in order to prevent sympathetic ophthalmia in the uninjured eye. Since a formal ophthalmologic surgical set was not available, we ended up using a sterilized child's marble to maintain orbital volume in patients receiving enucleation and evisceration.

A clinical case can help illustrate our evisceration technique employed. A child was sent to the CSH after being injured a week earlier. CT scan documented a serious ocular disorganization without any other serious cranial abnormality (Image 8). There were no serious injuries other than the lid laceration and limbus-to-limbus corneal laceration (Image 9). The ocular contents were removed as described in the evisceration technique, (Image 10) and the inside of the scleral pouch was treated with absolute alcohol in an effort to kill any residual retinal tissue (Image 11). A sterilized marble was placed in the scleral shell, and the sclera, Tenon's fascia, and conjunctiva was closed as described in the evisceration technique (Image 12). A retrobulbar injection of long-acting anesthetic was performed for additional pain control post-operatively (Image 13). The end result was an excellent cosmetic repair of the lid and preservation of the orbit (Image 14). In the future, a visiting NGO team will be able to fit this child with an ocular prosthesis.

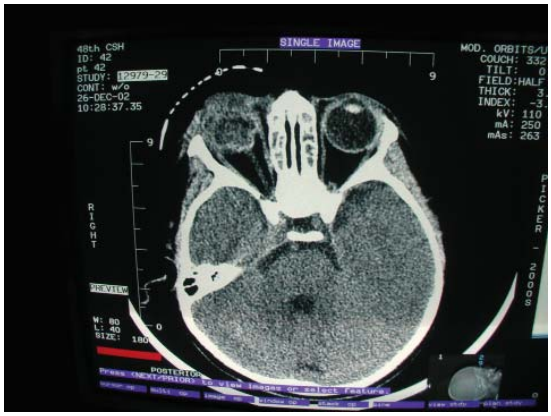


Image 8


Image 9


Image 10

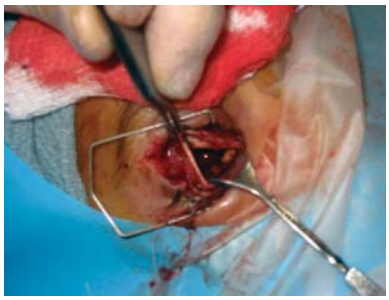


Image 11


Image 12


Image 13

Image 14

Another very interesting case involved a child who was injured a week earlier when a mine exploded, resulting in the loss of a major amount of brow and lid tissue. Miraculously, the eye itself was intact but the vision was threatened because of the developing cicatricial ectropion (turning-out of the eyelid margin secondary to scarring) resulting in secondary exposure keratopathy (severe drying of the corneal surface) (Image 15) .Normally a lid reconstruction would be performed using post-auricular skin. However, as seen in the preoperative photo, there was extensive burn injury from the blast that prevented harvesting of post-auricular skin for this purpose. The boy was 10 years old, and uncircumcised, since in this area of Afghanistan the boys were circumcised at puberty. After appropriate consent from the boy's father, the hospital commander and general surgeon performed a circumcision, providing me with graft material to reconstruct the lid (Image 16). Through a translator, the boy's father very casually said "why not, it would have to be done in a year or two anyway!" The excised foreskin provided an excellent repair. A temporary tarsorraphy was placed, and removed after one week (Image 17).

Image 15

Image 16

Image 17

Another gratifying case involved a child who came in with both eyes injured from a blast. The father alleged that a young son had brought an unexploded Russian mine inside the home and it exploded. In fact, all three boys were injured, as was the father. In actuality, the father appeared to have been attempting to disassemble the Russian mine in an attempt to create an improvised explosive device (IED) when it went off, blowing off his right hand at the wrist and injuring his left hand severely. The father had extensive superficial foreign bodies in both corneas without intraocular penetration (Image 18). His eldest son had bilateral ruptured globes. However, the left eye was able to be salvaged, in that I was able to do a simple lens removal and close the injured eye. The boy had an enucleation of the more severely injured right eye, (Image 19) and was referred to the Noor Eye Hospital for a pair of aphakic glasses.

Image 18 COL Enzenauer in OR

Image 19

Image 20 Noor Eye Hospital

(Image 20). Even in the U.S., attempting a secondary lens implant on a child's single seeing eye would probably not be justified.

Image 21 Pre-op

Image 22 Post-op

Image 23 Pre-op

Image 24 Post-op

I was able to perform several elective strabismus surgeries, improving the quality of life of several children. During our deployment, the Muslim holy day Friday, was the one day in seven that was a "day off", since the SF Soldiers were supporting the Afghan National Army. Our "eye surgery team" from the FOB traveled regularly on our Friday "training holidays" to perform scheduled eye surgery at the CSH. I was not presented with any girls with strabismus; only boys were brought to me for surgical correction of their ocular misalignment (Pictures 21-24).

Fortunately, most of the children were healthy (Image 25 & 26).

Image 25

Image 26

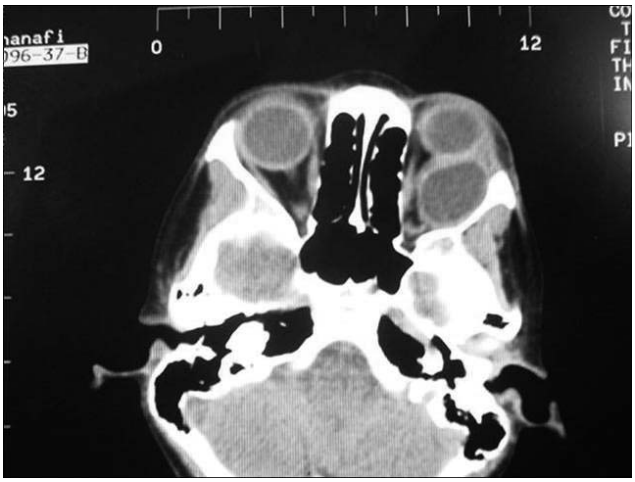


Image 27

Image 28

I actually completed a study of Vitamin A deficiency in Kabul with the help of the staff at the NOOR Eye Hospital. Malnutrition, as evidenced by keratitis caused by a vitamin A deficiency, was present in only 7% of children in Kabul.[1] However, without specialty eye care beyond simple cataract surgery, most ocular conditions progressed incredibly without intervention. The accompanying CT scan reveals a large orbital dermoid that is threatening vision (Image 27). The striking clinical photo shows a toddler with a large tumor protruding out of a blind right eye (Image 28).

This deployment to Kabul, Afghanistan showed the unique versatility embodied in some of our SF multi-talented citizen Soldiers. As a mobilized ARNG flight surgeon, I ended up being the sole trained eye surgeon available to provide emergency eye care for a period of time in Afghanistan. The preventive medicine NCO for our battalion was an experienced ophthalmic technician in his civilian life. He was able to assist in surgery to allow sophisticated eye surgery, both emergent and non-emergent, at the supporting CSH.

Battlefield Management of Penetrating Eye Injuries

(Taken from the NATO War Surgery Manual)

Triage of Patients with Eye Injuries

- ABCs and life-threatening injuries have priority, then eyesight and limb.
- Mild eye injuries may be treated and returned to duty by non-specialized personnel.
- More severe injuries should be evacuated to save vision.
- Distinguishing major ocular injuries from minor ones may be difficult.

Identifying Eyes with Severe Injuries

- Associated injuries
- Shrapnel wounds of the face – think intraocular foreign body
- Lid laceration – check for underlying globe laceration
- Vision
- Use book print, medication labels, counting fingers, etc. to evaluate vision.
- Severe vision loss is a strong indicator of serious injury
- Eyeball structure
- Obvious corneal or scleral lacerations
- Subconjunctival hemorrhage – may overlay an open globe
- Dark uveal tissue presenting on the surface of the eye indicates an open globe
- Foreign body – did it penetrate the eye?
- Blood in the anterior chamber (hyphema) indicates severe blunt trauma or penetrating trauma
- Proptosis
- May indicate a retrobulbar hemorrhage
- Pupils
- Pupil distortion - may be associated with an open globe
- Motility
- Decreased motility on one side may be caused by an open globe
- Other causes include muscle injury, orbital fracture, and orbital hemorrhage

Open Globe

Disruption of the structural integrity of the eyeball (open globe) may result from penetrating eye trauma

(especially shrapnel in a combat casualty) or blunt trauma and may cause loss of vision from either disruption of ocular structures or secondary infection (endophthalmitis). CT scan of the head may help to identify a metallic intraocular shrapnel fragment in a casualty with severe vision loss, a traumatic hyphema, a large subconjunctival hemorrhage, or other signs suspicious for an open globe with an intraocular foreign body. Do not perform an MRI on a patient with a suspected metallic ocular foreign body.

Immediate Treatment of an Open Globe

- Tape a rigid eye shield (NOT a pressure patch) over the eye
- No pressure on or manipulation of the eye
- No topical medications
- Gatifloxacin 400mg po (in the Combat Pill Pack)
- Emergent referral to an ophthalmologist
- Tetanus toxoid if indicated
- NPO if surgery is imminent
- Prevent emesis with phenergan (50mg IM/IV or compazine 10mg IM/IV)

Note: The NATO War Surgery Manual actually recommends levofloxacin, a third-generation fluroquinolone. Gatifloxacin is a fourth-generation fluoroquinolone and this is the antibiotic currently recommended in the Tactical Combat Casualty Care guidelines if the casualty is able to take medications by mouth. Gatifloxacin provides wider antibiotic coverage than levofloxacin and is a better choice for penetrating eye injuries.

Reference:

1. Mihora LD, Jatla KK, Little I, Campbell M, Rahim A, Enzenauer RW. Vitamin A deficiency in Afghanistan. *Eye & Contact Lens 2004*;30(3):34-37.

Multitudes of host nation individuals awaiting to be seen at SF MEDCAP. Uniformed Afghan National Army soldiers in BDUs are providing security just weeks after graduating basic training, a FID mission performed by the FOB.

Authors Enzenauer and Vavra performing strabismus surgery at U.S. Army CSH in Bagram. Dr Enzenauer wearing cap of Nepalese Special Forces (cap was a gift from Russian special forces medical officer).

Robert W. Enzenauer, MD, is a senior flight surgeon in the Colorado Army National Guard with over 30 years of combined active duty and National Guard service. His last assignment on active duty was as the chief of ophthalmology at Fitzsimons Army Medical Center in Colorado. He has served as the battalion surgeon with the 5/19th SFG(A) since 1998. Besides his year-long deployment to Afghanistan 2002-2003, he deployed to Iraq in 2003-2004 with the Colorado Army National Guard Area Support Medical Company from Montrose, Colorado.

Dean E. Vavra recently retired after 20 years of service. SSG Vavra spent over 12 years on active duty. SSG Vavra deployed as a military eye technician to Iraq during Desert Shield and Desert Storm, working with a senior military optometrist fitting disposable contact lenses for helicopter pilots. SSG Vavra completed his military career, serving as the Preventive Medicine NCO for the Colorado Army National Guard SF battalion, including a year-long activation 2002-2003 with duty in Afghanistan in support of OEF.

Authors Enzenauer and Vavra in OR at U.S. Army CSH in Bagram awaiting implant (marble) to be sterilized during evisceration surgery.

Author Enzenauer examining blind child at the "palace" in downtown Kabul.

Authors Enzenauer and Vavra performing intraocular surgery at the CSH in Bagram. Assisting at microscope is oromaxillofacial surgeon MAJ Temple, DC (former SF dental officer), and hospital Commander COL Al Beitler, MS observing.

Abstracts from Current Literature

A Follow-Up Analysis of Factors Associated With Head-Injury Mortality After Paramedic Rapid Sequence Intubation

Journal of Trauma-Injury Infection & Critical Care. 59(2):484-488, August 2005.
Davis, Daniel P. MD, FACEP; Stern, Jessica BS; Ochs, Mel MD; Sise, Michael J. MD, FACS; Hoyt, David B. MD, FACS

Background: The San Diego Paramedic Rapid Sequence Intubation (RSI) Trial documented an increase in mortality after paramedic RSI, with hyperventilation identified as a contributing factor in a small subgroup analysis. Here we explore factors affecting outcome in the entire cohort of patients undergoing paramedic RSI to confirm previous findings. This also represents a synthesis of findings from previous analyses. ***Methods:*** Adult trauma patients with severe head injury (Glasgow Coma Scale score, 3 to 8) who could not be intubated without RSI were prospectively enrolled in the trial. This analysis excluded patients without traumatic brain injury (head/neck abbreviated injury score <2 or failure to meet Major Trauma Outcome Study criteria) or death in the field or within 30 minutes of arrival. Each remaining trial patient was matched to two nonintubated historical controls from the county trauma registry based on: age, sex, mechanism, abbreviated injury scores for each body system, and Injury Severity Score. Logistic regression, cohort analysis, mean least squares regression, and discordant group analysis were used to explore the impact of various factors on outcome. ***Results:*** Of the 426 trial patients, 352 met inclusion criteria for this analysis and were hand-matched to 704 controls. Trial patients and controls were identical with regard to all matching variables. Mortality was increased in RSI patients versus matched controls (31.8 versus 23.7%; odds ration, 1.5; 95% confidence interval, 1.1 to 2.0; $p < 0.01$). Hyperventilation was associated with an increase in mortality, whereas transport by aeromedical crews after paramedic RSI was associated with improved outcomes. The reported incidence of aspiration pneumonia was higher for the RSI patients. ***Conclusion:*** Paramedic RSI was associated with an increase in mortality compared with matched historical controls. The association between hyperventilation and mortality was confirmed. In addition, patients transported by helicopter after paramedic RSI had improved outcomes. Paramedic RSI did not seem to prevent aspiration pneumonia.

Hypotension Does Not Increase Mortality in Brain-Injured Patients More Than it Does in Non-Brain-Injured Patients.

Journal of Trauma-Injury Infection & Critical Care. 59(4):830-835, October 2005.
Shafi, Shahid MD, MPH; Gentilello, Larry MD

***Objectives*:** Hypotension increases mortality after all types of injuries. Prior studies comparing mortality of hypotensive traumatic brain injury (TBI) patients to normotensive TBI patients have implied that hypotension is particularly detrimental after TBI. It is unknown whether hypotension affects TBI patients more severely than it affects other types of patients. We hypothesized that hypotension does not increase mortality in TBI patients more than it does in non-TBI patients. ***Methods*:** National Trauma Data Bank (1994 to 2002) patients aged 18 to 45 years with blunt mechanisms of injury treated at Level I and Level II centers were included. Deaths occurring before 24 hours were excluded. Logistic regression was used to measure the association between hypotension (<<90 mm Hg) and death after adjusting for confounding variables of age, gender, comorbidities, complications, Glasgow Coma Scale score, and severity of associated injuries. Odds ratios (95% confidence interval) indicate the risk of death in hypotensive patients in each group compared with normotensive patients in the same group. ***Results*:** The study population consisted of 79,478 patients (TBI, 30,742; no TBI, 48,736). Hypotension independently quadrupled the risk of death after adjusting for confounding variables (odds ratio [OR], 4.8; 95% confidence interval [CI], 4.1-5.6). However, increase in this risk associated with hypotension was the same in TBI (OR, 4.1; 95% CI, 3.5-4.9) and non-TBI patients (OR, 4.6; 95% CI, 3.4-6.0). Furthermore, the relationship between hypotension and TBI did not change with increasing head Abbreviated Injury Scale score severity. ***Conclusion*:** Hypotension is an independent risk factor for mortality. However, it does not increase mortality in TBI patients more than it does for non-TBI patients.

Determinants of Futility of Administration of Recombinant Factor VIIa in Trauma.

Journal of Trauma-Injury Infection & Critical Care. 59(3):609-615, September 2005.
Stein, Deborah M. MD, MPH; Dutton, Richard P. MD, MBA; O'Connor, James MD; Alexander, Melvin MS; Scalea, Thomas M. MD

***Background*:** "Off-label" use of human coagulation factor VIIa (FVIIa) is presently restricted to patients in extremis at our institution. Although bleeding will diminish in most patients, some will still die early as a result of irreversible shock and/or rebleeding. Futile administration of FVIIa significantly increases the economic burden of this expensive therapy and therefore limits its availability. On the basis of both human and in vitro studies, profound acidosis may be expected to predict lack of response. In addition, the depth of hemorrhagic shock, as defined by the degree of hypoperfusion over a given period of time, may be predictive of failure of FVIIa administration. We hypothesized that retrospective review of FVIIa use would identify variables associated with clinical futility. ***Methods*:** Characteristics of patients receiving FVIIa for acute traumatic hemorrhage were identified. Patients were retrospectively stratified into two groups; those who died as a result of acute hemorrhagic shock (nonresponders) and those in whom hemostasis was achieved and sustained (responders). Demographics, laboratory values, transfusion requirements, and outcomes were recorded for all patients. Data were analyzed using the Student's t test to identify the clinical characteristics of nonresponders and stepwise logistic regression was then used to identify independently predictive factors. A classification and regression tree analysis was conducted to develop a decision tree on the basis of our results. ***Results*:** Eighty-one patients received FVIIa therapy over a three-year period. Among the 46 patients treated for acute hemorrhage, there were 26 with blunt and 20 with penetrating mechanisms of trauma. Average age was 35+/-15 years, 72% were male, and the average Injury Severity Score was 36+/-15. Revised Trauma Score (RTS), lactate, and preadministration prothrombin time (PT) each predicted lack of response ($p < 0.05$ for each). RTS and PT were independently predictive of failure of response. An RTS of less than 4.09 and a PT of greater than or equal to 17.6 seconds were significantly associated with futile administration of FVIIa. Age was a significant factor in patients with a PT greater than or equal to 17.6 seconds, whereas ISS was significant in patients with an RTS greater than or equal to 4.09. ***Conclusion*:** Profound acidosis and coagulopathy may predict failure of FVIIa therapy. Depth of hemorrhagic shock, as described by the RTS, was also associated with futile administration. These variables should be considered as potential contraindications to the use of FVIIa. Earlier administration of FVIIa, before the development of massive blood loss and severe shock, may increase the rate of clinical response.

M-Statistic Study: Arguments for Regional Trauma Databases.

Journal of Trauma-Injury Infection & Critical Care. 58(6):1272-1277, June 2005.
Joosse, P MD; Goslings, J C. MD, PhD; Luitse, J S. K. MD; Ponsen, K J. MD

Background*:** The TRISS methodology, in combination with coefficients derived from the Major Trauma Outcome Study (MTOS), is the most widely used outcome prediction model for the care of trauma patients. With use of the M-statistic, different populations of trauma patients can be compared with the population originally enrolled in the MTOS. We hypothesized that databases outside of North America would not be well matched to the MTOS study and thus the TRISS methodology would not accurately predict outcome in these different populations. ***Methods*:** All trauma studies utilizing TRISS methodology that were published between 1990 and 2003 were reviewed, and M-statistics were calculated on the basis of the population described in the study. The populations were grouped by the following geographic locations: Europe, Asia/Africa, and North America. ***Results: The median M-statistic for Europe was 0.65, compared with 0.88 for Asia/Africa and 0.90 for North America. There was a significant difference between European and North American studies ($p < 0.05$). ***Conclusion***: The trauma populations described in European studies differ significantly from the MTOS with respect to injury severity match, indicating the need for the development of regional trauma databases and modified TRISS coefficients based on the geographic location of the injured population included.

After Action Report

John F. Detro

Mission: Raid to capture insurgents
Pre-Mission Planning:
- Medical Assault Force:
  - Medical vehicle — contents included oxygen, suction, automated external defibrillator (AED), fracture kits, surgical kits, hemorrhage control equipment
    - Aid bags left on vehicle — too cumbersome to carry on assault
  - Medical personnel carried enough Class VIII (medical supplies) to treat two seriously injured casualties
    - Platoon medic utilized a large fanny pack able to cover initial stabilization
    - Medical officer (MO) and senior medic used Ranger First Responder (RFR) fanny packs
    - Medical officer's fanny pack was packed mostly for hemorrhage control
    - Senior medic's pack was mostly for airway management
  - Assault force members carry hemorrhage control kits, which include Israeli trauma dressing, combat application tourniquet (CAT), elastic wrap, and pill pack (Tequin, Cox2 inhibitor, and acetaminophen)
  - Squad emergency medical technicians carried Ranger First Responder Kits, which include basic airway equipment, hemorrhage control, and intravenous kits

Casualty Evacuation Plan (CASEVAC): Non-standard medical aircraft:
- Primary: Ground evacuation was 7 to 10 minutes to Forward Surgical Team (FST) for one seriously injured casualty
- Secondary: CASEVAC by air to FST if one casualty
- Tertiary: CASEVAC by air to Combat Support Hospital (CSH) for Mass Casualty (MASCAL) situations

Mission

The company senior medic and medical officer reached the platoon medic who was already treating casualties. While treating casualties medical personnel covered their patients to prevent exposure. Several other injured were moved to the vehicle while the walking wounded continued to fight. Four litter patients were placed in the evacuation vehicle and the platoon medic and medical officer began treatment as the remaining medic remained behind in the building awaiting exfiltration. The Platoon Sergeant approached the vehicle and shouted to the medical officer asking him to return to the objective secondary to a casualty lying in the courtyard. The medical officer found his medic attempting application of an Asherman chest seal to the wounded's left chest wall. The casualty was bleeding profusely but awake and displaying no shortness of breath. The medic and medical officer determined the casualty did not have a sucking chest wound and attempted to control hemorrhage with a CAT. The medic found the wound was too high and applied an Israeli trauma dressing. The patient was moved to the evacuation vehicle and was the fifth casualty in a four litter vehicle. The senior medic performed a reassessment of the axillary artery patient by loosening his dressing, applying a HemCon dressing, and then redressing the wound with good hemorrhage control. Below is a description of the medical care performed on the objective as related to the principles of Tactical Combat Casualty Care (TCCC) guidelines.

Care under Fire (Still under effective enemy fire)

Courtyard: Sensitive items were secured by the assault force.

- **Casualty #1:** Had multiple shrapnel wounds to his bilateral lower extremities, abdominopelvic region, and left arm.
  Treatment: The patient was treated with bilateral tourniquets and then dragged to the medical vehicle.
- **Casualty #2:** Had multiple shrapnel wounds to his bilateral lower extremities, no airway compromise, moderate venous bleeding, and was alert and oriented (A&O) x 4.
  Treatment: The patient's wounds were exposed; dressings were applied to include an Israeli trauma dressing to the area of heaviest bleeding.
- **Casualty #3:** Sustained shrapnel wounds to his bilateral lower extremities and gunshot wounds to the left tibia and left axillary artery with arterial bleeding. He was A&O x 4.
  Treatment: His wounds were exposed but his axillary injury was too high for a tourniquet. The medic applied an Asherman chest seal followed by an Israeli trauma dressing (bleeding temporarily controlled).
- **Casualty #4:** Suffered multiple shrapnel wounds to his bilateral lower extremities and was A&O x 4.
  Treatment: An Infantryman performed treatment and patient was evacuated onto the medical vehicle.
- **Casualty #5:** Had multiple shrapnel wounds to his bilateral lower extremities.
  Treatment: An Infantryman provided treatment and the patient was evacuated to the medical vehicle.
- **Casualty #6:** Had multiple shrapnel wounds to his left leg and arm.
  Treatment: This casualty was able to continue fighting. No treatment was provided until he returned to the base camp.
- **Casualty #7:** Had shrapnel wounds to the right leg. The casualty continued to fight.
  Treatment: No treatment occurred until casualty evacuation while moving with the assault force.

Tactical Field Care

Medical vehicle:

- **Casualty #1:** The patient received one 400mcg fentanyl lollipop and 10mg of morphine intramuscularly with little to no effect on pain. The medic applied dressings to the heaviest bleeding with control of hemorrhage. The medical officer tied a blanket around the greater trochanters to provide pelvic stabilization due to possible pelvic fracture from shrapnel wounds.
- **Casualty #2:** The medical officer removed the patient's boots, constrictive dressings, and clothing due to developing compartment syndrome. The patient was given one 400mcg fentanyl lollipop and 10mg morphine intramuscularly with little effect.
- **Casualty #3:** Heavy arterial bleeding started to seep through the Asherman chest seal (ACS) but the patient displayed no difficulty breathing. The medic removed the Asherman chest seal and applied a HemCon dressing followed by an Israeli trauma dressing while achieving hemostasis. The patient was administered 20mg morphine intramuscularly with little relief of symptoms. Dressings were applied to other minor wounds.
- **Casualty #4:** Developed pain on passive extension of his toes and tense compartments to his bilateral lower extremities. He had minimal external bleeding. The patient's dressings were loosened without interference of hemostasis. He was given one 400mcg fentanyl lollipop and 20mg morphine intramuscularly with little effect on pain control.
- **Casualty #5:** The patient's dressings were loosened to evaluate hemostasis with no obvious bleeding. He was administered one 400mcg fentanyl lollipop. The patient complained very little about pain.

The casualties were moved to the helicopter landing zone with the four most severe being loaded first. During evacuation, confusion between the ground commander and the air commander lead to misinformation being passed to the CASEVAC medic who believed he was the only platform for evacuation. However, a second aircraft was launched for CASEVAC. The CASEVAC medic moved casualties to the FST based on the pre-mission plan. One Ranger medic climbed aboard the aircraft to provide enroute assistance. The second aircraft landed and the medical officer directed loading of patients and boarded the aircraft, directing the crew to fly to the CSH. The medical officer arrived at the hospital to find the first casualties had been inadvertently evacuated to the FST. The FST reassessed the patients and provided blood and redressed the wounds of casualty #3. The FST determined surgical intervention should occur at the CSH. The patient arrived at the hospital one hour after evacuation with hemostasis of his axillary artery injury.

CASEVAC Care

Forward Surgical Team: The total flight time was 3.5 minutes. While in-flight, the following care was rendered::

- **Casualty #1:** His wounds were reassessed and the medic started a saline lock with an 18 gauge needle utilizing his right arm.
- **Casualty #2:** The patient's wounds were reassessed and another dressing was applied, his vital signs were monitored, and a saline lock was initiated on his right anticubital fossa.
- **Casualty #3:** His wounds were reassessed and a saline lock was initiated in his right arm with an 18 gauge needle. He was given 10mg of morphine intravenously with decrease in pain.
- **Casualty #4:** The patient's wounds were reassessed and dressed.

Combat Support Hospital: 15 minutes – Three casualties were quickly evacuated to the CSH.

- **Casualty #5:** The patient's wounds were reassessed and a saline lock was started in the right anticubital fossa.
- **Casualty #6 and #7:** Their wounds were dressed and vitals were monitored. Casualty #6 received a saline lock.

End State: Twenty-one casualties, many received minor barotraumas leading to tympanic membrane perforations.

The Combat Support Hospital conducted surgery on eight casualties to include one axillary artery repair, five fasciotomies (due to secondary blast effects of grenades), three athrotomies, one exploratory laparotomy, and numerous wound irrigation/debridements. The most common non-surgical injury was tympanic membrane rupture from the primary blast effect of overpressure.

- **Casualty #1:** The patient underwent left axillary artery repair. He was ultimately evacuated to Landstuhl Army Regional Medical Center, Germany.
- **Casualty #2:** Underwent exploratory laparotomy after free air was seen on CT scanning of the abdomen; there were no bowel perforations or vascular injuries noted. He also underwent right forearm fasciotomy secondary to compartment syndrome, right knee arthrotomy secondary to shrapnel, and was evacuated to Landstuhl Army Regional Medical Center.
- **Casualty #3:** Underwent bilateral fasciotomies for compartment syndrome. He was subsequently evacuated to Germany for further care.
- **Casualty #4:** Underwent emergent fasciotomy of the right lower extremity and was later evacuated to Landstuhl.
- **Casualty #5:** Was diagnosed with a left open tibia fracture without evidence of compartment syndrome. He was taken to the operating room for surgical irrigation and debridement followed by splinting. He was evacuated to Landstuhl.
- **Casualty #6:** Suffered a right wrist shrapnel wound with small radial styloid fracture. Foreign body removal was performed without need for surgical intervention of the fracture. He was splinted and returned to his unit.

- **Casualty 7:** Was unable to ambulate due to right leg weakness. He had sustained multiple shrapnel wounds but no compartment syndrome. He was evacuated Landstuhl where EMG/NCS revealed a sciatic nerve injury
- **Casualty 8:** Underwent right knee foreign body removal followed by return to his unit.

The remainder of the force was evaluated and numerous shrapnel wounds and tympanic membrane ruptures were treated conservatively.

After Action Review included pre-mission planning, tactical combat casualty care guidelines, CASEVAC movement and coordination with the Forward Surgical Team versus Combat Support Hospital.

Sustain

Issue: Utilization of medical evacuation vehicles.
Discussion: Multiple missions were previously conducted without medical evacuation vehicles. It would not have been possible to treat casualties enroute to CASEVAC if a medical vehicle were not utilized.
Recommendation: Medical vehicles should be utilized on all ground assault force missions.

Issue: Increased medical capability
Discussion: If the threat and the vehicle is a distance from the objective, medical personnel will not be in a position to move to the casualties to provide care.
Recommendation: During high threat forced entry missions, all medical personnel should move with the unit to the objective.

Issue: Review of Tactical Combat Casualty Care (TCCC) guidelines
Discussion: Patients were treated according to unit protocols and sustained injuries compatible with TCCC treatment guidelines (i.e., no airway adjuncts needed)
Recommendation: Continue to train to TCCC guidelines and revise as lessons are learned.

Issue: Training on compartment syndrome caused by blunt/penetrating trauma to extremities
Discussion: The medics received a lecture on compartment syndrome early during the deployment. The authors' prior communication with Landstuhl surgeons revealed over 60 cases of missed compartment syndrome cases that led to permanent disability or amputation.
Recommendation: Continue to include compartment syndrome in medical training scenarios and stress vigilance of wound reassessment.

Issue: Ranger First Responder (RFR) training and treatment
Discussion: The assault force personnel provided emergent care to several of the injured. This process enabled the medics to focus on the most severely wounded men.
Recommendation: Continue to conduct Ranger First Responder training and casualty treatment assessments during all training missions and deployments focusing on the six critical tasks which include: evaluate a patient, open and secure an airway, seal an open pneumothorax, needle decompression of a tension pneumothorax, control external bleeding, and initiate a saline lock/intravenous infusion.

Improve

Issue: Pain control of severely injured patients
Discussion: The fentanyl lollipop (400mcg) has been effective for severe sprains and blunt trauma fractures but has not provided adequate relief for severe injuries such as gunshot wounds/compartment syndromes. The time to action is delayed and most patients required intravenous or intramuscular pain control.
Recommendation: Maintain fentanyl as an option for mild/moderate pain but have a low threshold for utilization of morphine or consider 800mcg fentanyl lozenges/lollipops.
Issue: Coordination with the Forward Surgical Team prior to the execution of all missions to determine full capabilities and limitations.
Discussion: The most severely injured patient received blood and his wounds were redressed. However, the

surgeons attempted no surgical intervention for the axillary artery injury.
Recommendation: The flight time to the CSH was limited when compared with the increased capability. The medical team recommends over flying of the FST and transport all patients to the CSH.

Issue: Sked litter in an urban environment.
Discussion: The Sked litter has been outstanding in many environments (desert, mountains, and streets) but not military operations in an urban environment (MOUT). The Sked requires unfolding, flattening, and strapping the patient into the litter. This is not an option in the "care under fire" phase of an urban raid. Patients were dragged into the street with body equipment on and placed on litters within the medical evacuation vehicle.
Recommendation: Explore simple rigid litters that are easy to open/carry and require no straps. The patient can be quickly carried to a safe area and transloaded to a more stable litter when time and tactics permit. The medical team will conduct assessments of several litters during the next training cycle to find a more MOUT worthy device.

There I Was

The Special Operations Medic Down Under
SOMDU
"Some Do"

MSG David W. Ezzell (USASF)
SGT Alex Maroske (ASASR)

Introduction

On Monday, 1 August 2005, I was extended the incredible opportunity to travel to Australia and lend a hand to our Australian Special Air Service Regimental (SASR) brethren. I was asked to serve as an assistant instructor for the Australian SAS Regiment's Patrol Advance First Aid (PAFA) Course. The Group Commander, COL Rick Thomas, along with the Australian SASR Regimental Commander, COL McMahon, approved of this exchange of knowledge and I soon was flying south for the spring.

As the U.S. Army remains focused on the Global War on Terrorism (GWOT), it is quite refreshing to find that our coalition forces also continue to compile and incorporate their expertise and lessons learned into their ongoing training and operations designed to combat tyranny and terror.

While I was pleased to have been selected by the CSM to assist in the six week course known as the Special Operations Medic Training Course - Down Under (affectionately known as "Some Do"), and anticipated a great experience, I had no idea what a great experience I was in for.

The Australian SASR PAFA Course

On the southwest shores of Australia, near Perth, lies a small Army post named Campbell Barracks of Swanbourne. This is home to the SASR's very challenging six-week medical PAFA Course. This course was established for the selected SAS candidates who are to become team medics after earning their Sandy Beret with the Flaming Excalibur – the traditional headgear of the ASASR. Here, candidates receive instruction on both didactic and practical trauma and clinical medicine. As alluded to above, the course is also referred to the Special Operations Medic Training — Down Under, or SOMT-DU; as NCOIC, SGT Alex Maroske, and his instructor, SGT David Leak put it: "Some Do…and Some Don't," meaning, some make it and some don't. Failing encompasses less than one percent of those selected to attend the advance first aid course. The following is a summary of the course, its goals, input from the SASR NCOIC, and, of course, some observations from this "Yank."

Candidates receive instruction on both didactic and practical trauma and clinical medicine.

The PAFA Course begins in the Australian spring time with the cool, rainy days intermittently providing realistic training opportunities while participating in trauma scenarios. The future SASR PAFA Operator upon completion of the three-phase, six-week course, will be the primary aid provider for a five-man team. He begins phase one of his training with Pre-Hospital Trauma Life Support with a very heavy emphasis on the triple-C (Trauma Combat Casualty Care) principles. The candidate is put through several combat-under-fire casualty care scenarios dealing with gunshot or blast wounds to the extremities, torso, and head. As in the U.S. SOF TC3 course, the advance first aid provider must obtain superior fire power and overcome the threat prior to rendering aid, or drag the casualty to a secured area under covering fire; the area MUST be safe and secured, and, as in our combat and trauma scenarios,

the aid provider must announce that the area is safe and secured. The emphasis is directed to major hemorrhage control with tourniquets, roller dressings, or hemorrhage chemical control dressings. The provider then concentrates on the airway, establishing an airway, and securing that airway; he continues to evaluate the casualty simply by using the ABCDE methodology, assessing breathing, circulation, and disability; exposing the patient and addressing all other injuries encountered, including fractures. He continues with the secondary survey, re-examining all treatment rendered and recording the base-line vitals. The PAFA then establishes a landing zone for evacuation, communicating the nine-line medical evacuation request. He immediately administers a broad spectrum antibiotic, pain medication as needed, and infusion of electrolyte fluid, according to the amount of blood loss, titrated to correspond with the vital signs. Unlike the Special Forces medic, who is trained to continue onto definitive medical care and recovery, the PAFA must evacuate the patient within 24 to 48 hours. He does not have the resources or the training to continue on to definitive medical care.

The future SASR PAFA Operator working on skills in phase one of his training with Pre-Hospital Trauma Life Support

By the completion of the second week, their new skill set includes surgical crico-thyroidotomy, needle thoracentesis, hemorrhage control, minor suturing, and intravenous infusion. The skills are consolidated during two day sessions of live tissue training at the University of Western Australia where they are challenged to render aid to save the life of the patient, utilizing the knowledge taught to them during the didactic and trauma scenarios prior to this event. After this, they receive classes in pharmacology, learning to administer approximately 53 drugs which they are authorized to carry. In comparison, the Special Forces medic receives weeks of live tissue training, along with performing thoracostomies and open abdominal wounds with mesenteric bleeds, external fractured fixation, and advanced cardiac life support care; they also receive training in anesthesia induction and surgical tissue repair. Their pharmacology is far more extensive than the 53 drugs that are taught at the PAFA course. The PAFA receives no laboratory training whereas the SF medic is taught a gambit of laboratory skills, including complete blood cell count with differentials, blood screens, fecal screens, and bacteriological stains.

The second phase of the course consists of theory-based lessons on common illnesses and conditions of countries in their specific area of operations. The PAFA candidate is taught infectious, childhood, and sexually transmitted diseases and signs and symptoms of those diseases and treatment. They are also taught history taking and clinical examination skills. Together with a set of problem solving sheets, the PAFA is assessed on a variety of scenarios, both theoretical and practical. The students continue to be integrated into scenarios of coalition forces' operations utilizing the nine-line medical evacuation system as a component with other joint/combined operations. The SASR candidates are transported over to Pierce Royal Air Force Base to receive classes on air medical evacuation. They participate in loading patients into UH-60 Black Hawk helicopters and call in for air medical evacuation utilizing the nine-line procedure. All this will contribute to the vast majority of their medical knowledge as new members on a SASR five man patrol.

The third and final phase of the training consists of a variety of skills to manage humanitarian assistance missions. These skills include pediatrics, obstetrics and gynecology conditions, along with preventive medicine issues. This historically has been an invaluable component of "hearts and minds" operations conducted by SASR throughout its involvement in the Special Operations environment. It enables the patrol to develop the needed rapport within their area of operations (AO) and ultimately achieve mission success. The SF medic has the same goal in mind, but is there for a longer duration of time, establishing clinics, and teaching the indigenous personnel and soldiers to become medics, nurses, and medical physician's assistants.

The ultimate goal of the course is to produce competent, clear-thinking medics to provide needed medical care, stabilizing the patient/casualty with minimal medical equipment and supplies for evacuation within 24 to 48 hours. This is accomplished in a very short time of six weeks, compared to the 56 weeks of the SF medic candidate.

SAS PAFA Instructors

The instructor core usually consists of two medical doctors and two independent medical corpsmen, EMT (P), for a class of 18. This year, the course was fortunate to have on hand an emergency physician and veterinarian, Captain Greg Button (RMO), a forensic pathologist and medical doctor, WGCDR Tim Lyons (RAAF - Specialist Reserve,) and an 18Z/D from the U.S. Army 1st Special Forces Group (Airborne) to assist in the live tissue instruction at the university. Moulaging the casualties during the scenarios takes priority, creating traumatic injuries that are realistic enough to give the medics a pragmatic approach to trauma management.

Left side - standing - MSG EZZELL; front row-left to right - SGT Maroske, two students, CDR Lyons, CPT Button, two students; Right side - standing SGT Leake.

SASR Instrutors- - L-R Doctors Buttons, Lyons, SGT Leake, SGT Maroske, Constable Cutts, MSG Ezzell.

Constable Craig Cutts was on board to deliver the desired effects needed for the trauma scenarios. He volunteers for the reserves every year to travel from the Gold Coast (Brisbane/eastern Australia) to lend his knowledge and expertise to create rational-looking injuries. The previous two courses have been able to receive assistance from the 1st Special Forces Group's exchange NCO, SFC Donald J. Smith, 18D. He has been instrumental in the creation of the 18D Assistance Program between 1st SFGA and the Special Air Service Regiment (SASR). This program is fully funded by SASR in order to establish interoperability and care of the wounded operators on the battlefield in the present GWOT.

Conclusion

The SASR PAFA candidate receives a tremendous amount of medical knowledge in a short amount of time. However, even though their training is approximately 50 weeks less than the SF Medic, they receive the essential medical training to save life, limb, and eyesight. When the PAFA is at his home station, he has the opportunity to maintain his medical skills and continue to increase his medical education by working with the medical doctors at various clinics which are run by the Australian Army.

The continuation of this exchange with 1st Special Forces Group (Airborne) is imperative for the integration of our coalition forces during this time of war. As we all know, the main combat medical evacuation is conducted by the U.S. Army and Air Force and procedures of evacuation should be interchangeable to the service providing evacuation support. At the time of this training in August of 2005, the Regiment was on their way to Afghanistan. As the Australian Army's Special Air Service Regiment continues to contribute to the operations of the coalition forces in the GWOT, their motto simply states: "WHO DARES, WINS." DE OPPRESSO LIBER

Ranger Recognized for Excellence by Surgeon General

By Kim Laudano
75th Ranger Regiment Public Affairs Office

FORT BENNING, GA (USASOC News Service, Mar. 27, 2006) – An Army Ranger was presented the 2006 Surgeon General's Physician Assistant Recognition Award during a ceremony here 24 Mar.

CPT John F. Detro, Physician Assistant, 3rd Battalion, 75th Ranger Regiment, received the award for outstanding contributions to military medicine.

Detro was nominated for the award by COL James R. Ficke, who was the Deputy Commander of Clinical Services at the 228th Combat Support Hospital during Detro's last combat deployment.

The Physician Assistant award is given to one active duty Army physician annually. Commanders nominate Soldiers for the award and then the submissions are reviewed by an appointed board that makes recommended selections for the Surgeon General to approve. A Soldier may only receive the award once in his or her career.

"CPT Detro distinguished himself as one of the U.S. Army's finest medical providers while deployed with the (3rd Ranger) Battalion to northern Iraq in support of Operation Iraqi Freedom from July through November 2005," he said in Detro's nomination packet. "He clearly exemplifies the selfless service, leadership, and dedication that have given Army physician assistants their sterling reputation in combat casualty care."

During that deployment, Detro participated in more than 40 combat missions. His role was to provide immediate responsive casualty care if Soldiers were injured on en-route to, on or returning from an objective.

SGT Webster J. Slavens, a senior medic assigned to 3rd Battalion, 75th Ranger Regiment, also helped nominate Detro for the award. "CPT Detro is an excellent physician assistant with a vast knowledge of his job," he said. "His most important concern is for his men."

Despite CPT Detro already having one Purple Heart before this deployment, he refused to stay behind at the aid station during missions. "He went on many hazardous missions to provide the most medical coverage that he could," said Slavens.

Detro's nomination packet described several such dangerous missions, one of which was highlighted during the ceremony. The element Detro was traveling with had just conducted a structure breach when troops were immediately injured by enemy gun and grenade fire. Detro rushed in to the room under enemy fire to treat seriously wounded Rangers. He protected the wounded from shrapnel by covering them with his body as grenades continued to explode in close proximity around them.

Ignoring wounds he himself received, Detro helped to evacuate the injured Rangers from the objective to the medical transport aircraft. He then treated the Rangers en-route to the combat support hospital and stayed with the men into the next day to assist with patient care and surgeries.

"Even after receiving his second and third Purple Hearts during this deployment, he continued to run hazardous missions," Slavens explained. "This just showed his continuous commitment and concern for his men and their safety."

Detro said he was extremely honored to earn this award, especially because one of his medics helped to nominate him. "There are several outstanding physician assistants on the recipient list (for this award)…seeing the list of names on the Web site was very humbling."

In the 25 years that this recognition has been awarded, five recipients have been from the 75th Ranger Regiment.

Detro feels that the Army is full of physician assistants deserving this award. "They are leading the training of medics and first responders which has been critical in decreasing preventable deaths on the battle-

field," he said. "This is important because a physician assistant is generally the first medical officer to see a combat patient."

In addition to combat experiences, Detro has also made contributions to the medical community as a leader through academic training. He instilled this importance with each of his medics. "One product of this was that not one Ranger died during this intense combat deployment," said Ficke in Detro's nomination packet.

One of Detro's medical non-commissioned officers to whom he was a mentor, Slavens, was recognized as the 2005 U.S. Army Special Operations Command and U.S. Special Operations Command Medic of the Year.

Detro recognized the sacrifices of his family in support of his career. He currently lives in Columbus, Ga., with his wife Moraima. They have three children, Xaviera, Jose and Anthony, and two grandchildren, Mark and Micheala.

"My family has given a lot over the last 18 years and I am looking toward retirement," he said. "I could not see another place to be for that purpose than with the Army's finest fighting force. I feel extremely lucky to have served with such a great group of men."

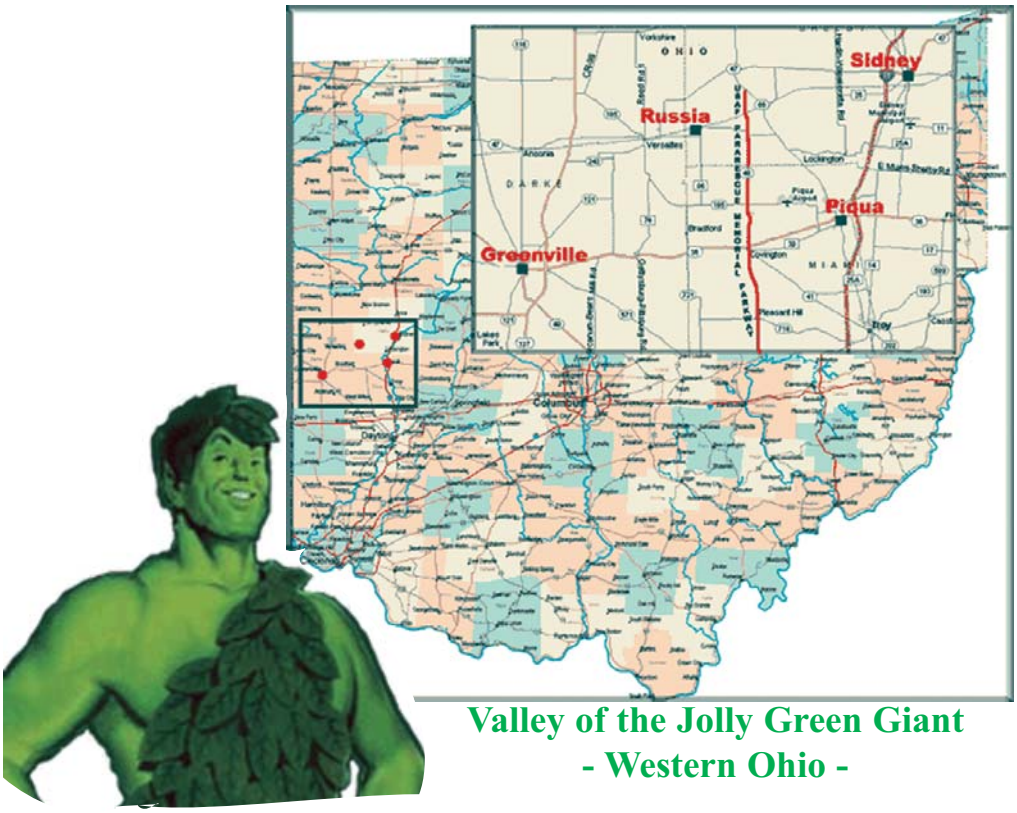
Detro was recently selected to be the next 75th Ranger Regiment Physician Assistant.

-USASOC-

CPT John F. Detro, Physician Assistant, 3rd battalion, 75th Ranger Regiment, receives the Surgeon General's Physician Assistant Recognition award from Colonel William Tozier, Assistant Corps Chief, Physician Assistant Section, Army Medical Specialist Corps, during a ceremony at Fort Benning, GA.

Ohio Governor Signs "PJ Parkway" Law

On February 15, 2005, with a stroke of a pen, Ohio Governor Robert Taft signed into law a legislative bill initiated and supported by a dedicated team of PJs that renames Ohio State Route 48 to the **U.S.A.F. Pararescue Memorial Parkway**.



Valley of the Jolly Green Giant
- Western Ohio -

The effort to rename State Route 48 began in October 2003, when a dozen PJs traveled to Sidney, Ohio, to attend the **James Locker** (Jolly Green 23) internment. After the funeral, the twelve PJs gathered together in Hospitality Room 109 of the Holiday Inn. During the course of conversation Doug McGill happened to mention that T.J. Bruce had told him previously of a tight cluster of four outstanding and highly decorated PJs who all came from the same neighborhood in southwestern Ohio.

In fact, all four PJs were raised just a country-mile either side of a *10 mile long section* of Route 48; (from left to right) **James Plieman**, the first PJ to lose his life in Vietnam; **Bill Pitsenbarger**, awarded the Congressional Medal of Honor; **James Locker**, brought home finally from Vietnam after 35 long years; and **William McDaniel**, who recently perished on a Special Operations anti-terror mission in the Philippines.

DC "Surfer Doc" Johnson, had an epiphany — "a PJ Parkway!" His idea was immediately picked-up by his fellow PJs in the room, and soon there was 100% agreement that this was something worth pursuing. The PJ Memorial Parkway Project was underway, and Bill Eby and Steven West, both Ohio PJs, volunteered to take up the challenge to get a bill through the legislature and onto the Governor's desk for signature, ASAP!

Subsequently, both PJs made highly effective presentations before the Ohio Senate Transportation Committee. A member of that committee, Senator Jim Jordan, wrote a bill that was passed immediately by the Transportation Committee and sent at once to the full Ohio Senate for a vote. It wasn't long before our PJ Parkway renaming bill passed the full Senate unanimously.

The just-passed bill was hand-carried from the Senate and rushed quickly to the Ohio House of Representatives arriving just in the nick-of-time to be assigned to a House Committee before the spring session ended last June. Over the summer recess, and throughout the winter session, the bill survived a tsunami of amendments, and, in the very last hour of the very last day ending the late December session, the bill finally was passed by the full House and sent to the Governor for the signature he'd promised from the beginning.

In attendance at the Governor's signing ceremony were family members of our four fallen PJ brothers: Mr. and Mrs. Bob McDaniel, **MSgt Bill McDaniel's** parents; Mrs. Dorothy Locker, mother of **Sgt James D. Locker**; Mrs. Rita Plieman Utz, sister of **A1C Jim Plieman**; and Mrs. Alice Pitsenbarger, step-mother of **SSgt Bill Pitsenbarger**.

Also attending were representatives of the U.S.A.F and Pararescue. Our honored guests included Lt General Richard V. Reynolds, Vice Commander of the Air Force Material Command; Lt Col Miller, the General's aide; and the Command Chief Master Sergeant, CMSgt Jonathan Hake. On the PJ side of the house we had Major Jeff Wilkinson CRO, MSgt Steve Elson, MSgt Karl Grugel, Senior Airman Rob Rosentreater (PJ Trainee), all from the 123rd STS, Kentucky Air National Guard, Louisville, and, from the Pentagon, SMSgt Ryan Beckmann. These impressive warriors had a tremendous impact on all who were in attendance. They did us proud! They have our deepest respect for their outstanding representation of the career field!

The bill's author and chief sponsor, Senator Jim Jordan, Ohio Senate President Doug White, and District 78 Representative Derrick Seaver, together with the PJ Parkway Project staff Bill Eby, Roger Porter, Steven West, and Doug McGill, were all there to witness a year's worth of work signed into law.

Immediately after the signing ceremony the family members, guests, and PJs assembled in a large ornate room just down the hall from the Governor's Office. There, each of the PJ families was presented a beautifully framed tribute proclamation from Representative Seaver's office. The tribute for each PJ brother was solemnly read aloud by Steven West and presented to each family by Representative Seaver. Framed, full-sized duplicates of all four tributes will be displayed at the Pararescue School. The tribute proclamations were initiated and written by Jerry Pearson with Adam Ward of Representative Seaver's staff.

After the tribute presentations and generous refreshments, the families were given a special tour of the Capital by the Senate's Sergeant-at-Arms.

S.E.R.T. Group International
Specialized Emergency Response Team

Scott Sheldon - President
P.O. Box 371231
Reseda, CA 91337-1231
Ph: 866/500-5465

SPECIAL OPERATIONS MEDICAL COURSES

Tactical Operations Medical Specialist

This high-speed, low-drag course covers the skills necessary to provide emergency medical care in the austere environment. Consisting of classroom, skills stations, and very realistic scenarios this course will provide a new tactical medical operator with the training necessary to support a SPECOPS team during operations and training. Course length is five days.

Curriculum Includes:
-Tactical Combat Casualty Care
-Role/Responsibility of TEMS Provider
-Medical Threat Assessment
-Ballistics
-Team Health
-Buddy Care
-Clan Labs
-Dental Care
-Pediatric Trauma
-Entry/Room Clearing Techniques
-Rescue Techniques
-Field Training Exercise

Special Operations Medical Provider

The course covers basic elements of providing operational emergency medical care in the austere environment. This offers the medical operator options for treating casualties in the tactical or combat environments. Course length is three days.

Curriculum Includes:
-Tactical Combat Casualty Care
-Medical Threat Assessment
-Ballistics
-Team Health
-Buddy Care
-Rescue Techniques

Pediatric Trauma in Tactical Operations

Prerequisite: **Assignment or intent to provide medical care in tactical operations.**

This course addresses the unique medical needs of the pediatric trauma victim. As noted in Operation Iraqi Freedom, kids pose a unique challenge to medical providers. Following the axiom that "kids are not small adults," this course will present assessment and treatment options for those children injured during tactical or combat operations.

Curriculum Includes:
-Kids and Combat Operations - A Primer
-The PALS Paradigm
-Patterns of Injury
-Treatment Options
-Skills
-Real World Scenarios

The following is a list of information resourses for contining education

Casualty Care Research Center
Department of Military and Emergency Medicine
Uniformed Services University
4301 Jones Bridge Road
Bethesda, Maryland, United States 20814-4799
Office: (301) 295-6263
Fax: (301) 295-6718
Web Site: www.casualtycareresearchcenter.org

CERTAC
P.O. Box 354
Drake, Colorado, United States 80515
Office: (970) 214-9355
Fax: None
Web Site: www.certac.com

Counter Force Training
3160 School Drive
Savanna, Illinois, United States 61074
Office: (888) 660-3442
Fax: (815) 273-3247
Web Site: www.counterforcetraining.org

Cypress Creek Advanced Tactical Team
c/o Cypress Creek EMS
16650 Sugar Pine Lane
Houston, Texas, United States 77090
Office: (281) 440-9650 Extension 156
Fax: (281) 440-7677
Web Site: www.ccatt.org

Direct Action Resource Center
6302 Valentine Road
North Little Rock, Arkansas, United States 72117
Office: (501) 955-0007
Fax: (501) 955-0080
Web Site: http://www.darc1.com

Gunsite Academy, Inc.
2900 West Gunsite Road
Paulden, Arizona, United States 86334
Office: (928) 636-4565
Fax: (928) 636-1236
Web Site: http://www.gunsite.com

Heckler & Koch, Inc.
International Training Division
21480 Pacific Boulevard
Sterling, Virginia, United States 20166-8903
Office: (703) 450-1900 Extension 293
Fax: (703) 406-2361
Web Site: http://www.tacticalmedicine.com/

HSS International, Inc.
P.O. Box 50 / # 337
Lake Arrowhead, California, United States 92352
Office: (909) 336-4450
Fax: (714) 242-1312
Web Site: http://www.hssinternational.com

Insights Training Center
P.O. Box 3585
Bellevue, Washington, United States 98009
Office: (425) 827-2552
Fax: (425) 827-2552
Web Site: http://www.insightstraining.com

Lion Claw Tactical
5900 East Virginia Beach Boulevard
Suite 408
Norfolk, Virginia, United States 23502
Office: (757) 321-2059
Fax: (757) 498-0059
Web Site: www.lionclawtactical.com

“Medic Up” Tactical Medic Training Course
3300 Via Giovanni
Corona, California, United States 92881
Office: (909) 340-9201
Fax: (909) 340-9201
Web Site: www.medicup.com

National Academy of Tactical Medical Response
3075 Shattuck Road
Suite 813
Saginaw, Michigan, United States 48603-3258
Office: (989) 585-4001
Fax: (989) 585-4001
Web Site: www.tacticalmedical.com

National Tactical Officer's Association
P.O. Box 797
Doylestown, Pennsylvania, United States 18901
Office: (800) 279-9127
Fax: (215) 230-7552
Web Site: http://www.ntoa.org

NWTC, Inc.
1844 North Nob Hill Road
Suite 406
Plantation, Florida, United States 33322
Office: (866) 328-2918
Fax: (866) 328-2918
Web Site: www.nwtcinc.org

Omega Tactical Consultants
7915 Trail Run Loop
New Port Richey, Florida, United States 34653
Office: (727) 243-6891
Fax: (727) 375-1577
Web Site: www.omegatacticalconsultants.com

Rescue Training, Inc.
9-A Mall Terrace
Savannah, Georgia, United States 31406
Office: (877) 692-8911
Fax: (912) 692-1338
Web Site: http://www.emtt.org

Spartan Group International
Applied Training and Consulting Division
P.O. Box 671
Mamers, North Carolina, United States 27552
Office: (877) 977-2782
Fax: None
Web Site: http://www.spartangroup.com

SERT Group International
P.O. Box 371231
Reseda, California, United States, 91337-1231
Office: (866) 500-5465
Fax: (818) 344-8099
Web Site: http://thesertgroup.homestead.com

Specialized Medical Operations, Inc.
P.O. Box 530520
Henderson, Nevada, United States 89053
Office: (702) 617-1655
Fax: (702) 920-7635
Web Site: www.specmedops.com

Special Operations Tactical Training International
P.O. Box 830
Dover, Tennessee, United States 37058-2716
Office: (931) 232-6593
Fax: (931) 232-6542
Web Site: www.sottint.com

STS Consulting
PMB Box 176
1981 Memorial Drive
Chicopee, Massachusetts, United States 01020
Office: (413) 531-8699
Fax: (413) 532-1697
Web Site: www.tactical-ems.com

Tac1Aid
157 Middle Road
Newbury, Massachusetts, United States 01922
Office: (978) 499-0492
Fax: None
E-mail: Tac1Aid@hotmail.com

Tactical Element, Inc.
380-H Knollwood Street
Suite 140
Winston Salem, North Carolina, United States 27103
Office: (336) 945-2289
Fax: (336) 945-2289
Web Site: www.tacticalelement.cc

Team One Network
620 Richards Ferry Road
Fredericksburg, Virginia, United States 22406
Office: (540) 752-8190
Fax: (540) 752-8192
Web Site: www.teamonenetwork.com

The Tactical EMS School
1309 Dawn Ridge Road
Columbia, Missouri, United States 65202
Office (573) 474-2436
Fax (573) 474-2436
Web Site: www.tactical-specialties.com

X-TEMS
P.O. Box 925
Loveland, Ohio, United States 45140
Office: (513) 583-3001 Extension 500
Fax: (513) 583-3012
Web Site: www.xtems4life.com

VETERINARY MEDICINE

K-911 Emergencies, Inc.
P.O. Box 8652
Jupiter, Florida, United States 33468-8652
Office: (561) 575-2514
Fax: None
Web Site: www.k911emergencies.com

The ResQ Shop
1051 Meadow West Drive
El Paso, Texas, United States 79932
Office: (915) 877-4312
Fax: (915) 877-4242
Web Site: www.theresqshop.com

University of Florida
Department of Small Animal Clinical Sciences
2015 Southwest 16th Avenue
Gainesville, Florida, United States 32610
Office: (352) 392-4700 Extension 5700
Fax: (352) 392-6125
Web Site: www.doce-conferences.ufl.edu/k9

SOF and SOF Medicine Book List

Colonel Rocky Farr

New Revised List as of this edition!

Those of you who know my history of joining the Army at age 18 may realize that I have evidently conned the Army into sending me off for long term civilian schooling for my bachelor's degree, two master's degrees, and my doctor of medicine. Each time, I bought books. So below is my book list of military medical history and Special Operations Forces history books currently in my library. For a detailed list with the publishers and date of publication, please contact the JSOM at JSOM@socom.mil.

TITLE	AUTHOR	ISBN
15 Months In SOG: A Warrior's Tour	TL Nicholson, TP Nichols	0804118728
90 Minutes at Entebbe	W Stevenson, U Dan	0553104829
200 Years of Military Medicine	RC Engelman	
A Bugle Calls: The Story of the Witwatersr and Rifles	S Monick	620139846
A Concise History of U.S. Army Special Operations Forces	GT Barker	0922004099
A Concise History of the U.S. Army Airborne Infantry	GT Barker	0922004021
A Concise History of U.S. Army Airborne Infantry	GT Barker	0922004013
A Concise History of U.S. Army Special Operations Forces	GT Barker	
A Confederate Nurse: The Diary of Ada W. Bacot	AW Bacot, JV Berlin	0872499707
A Confederate Surgeon's View of Ft. Donaldson…	J Stanbery	
A Historical Perspective of SOF as Instruments of Strategy	GD Jones	CGSC 1991
A History of Medicine in South Carolina: 1825-1900	JI Waring, RH Shryock	SCMA
A History of Military Medicine	RA Gabriel, KS Metz	031327746X
A History of Special Forces in Somalia 1992-5	JD Celeski	
A Man Called Intrepid	W Stevenson	0345310233
A Medical Tour Through the Whole Island of Great Britain	L Appleby	05711739X
A Prototype of a Confederate Hospital Center…	PW Houck	B0006ELBYY
A Saw, Pocket Instruments, and Two Ounces of Whiskey: Frontier Military Medicine in the Great Basin	AP Sohn	0870622722
A Soldier with the Arabs	JB Glubb	0006DI81O
A Soldier's Story: The Double Life of a Confederate Spy	DL Phillips	567994253
A Special Breed of Man	E Edell	0934588082
A Surgeon's Civil War: The Letters of Daniel M. Holt	DM Holt, JM Greiner, JL Coryell	0873384946
A Study of the Medical Support to the Union & Confederate Armies During the Battle of Chickamauga: Lessons & Implications for Today's U.S. Army Medical Department Leaders	DA Rubenstein	CGSC, 1990
A Swift, Elusive Sword: What if Sun Tzu and John Boyd Did a National Defense Review?	CW Richards	1932019014
A Systematic Review of "Commando" (Special) Operations 1939-1980	E Lutwak, et. al.	
A Texas Surgeon in the C. S. A.	JQ Anderson	0007E4AEG
A Vast Sea of Misery: A History and Guide to the Union and Confederate Field Hospitals at Gettysburg, July 1 to November 20, 1863	GA Coco	0939631091
A Woman Doctor's Civil War: The Diary of Esther Hawks	G Schwartz, EH Hawks	0872494357
A Woman of Valor: Clara Barton and the Civil War	SB Oates	0028740122
About Face: Odyssey of an American Warrior	DH Hackworth, J Sherman	0671526928
African Guerrillas	CS Clapham	25321243X
AFSOF: A Unique Application of Aerospace Power	JA Hill	AU Press, 1993

Title	Author	ISBN
Airborne: A Guided Tour of an Airborne Task Force	T Clancy	0425157709
Air Commando! 1950-1975, AFSOC	ME Haas	0006PF6DA
America and Guerrilla Warfare	AJ Joes	0813121817
An Historical Survey: The U.S. Army Vietnam Individual Training Group (UITG) Program, 1971-73	KR Bowra	AWC 1991
An Intimate History of Killing: Face-To-Face Killing in Twentieth-Century Warfare	J Bourke	0465007376
Angels of Mercy	MP Oakes, I Sumner	1885938128
Any Place, Any Time, Any Where: The 1st Air Commandos in WWII	RD Van Wagner	076430447X
Apollo's Warriors: USAF Special Ops during the Cold War	ME Haas, et. al.	1585660353
April '65: Confederate Covert Action in the American Civil War	WA Tidwell	0873385152
Army Badges and Insignia Since 1945	G Rosignoli	0713706481
Army Medical Department 1775-1818	MC Gillett	1410202380
Army Medical Department, 1818-1865	MC Gillett	0160019540
Army Medical Department, 1865-1917	MC Gillett	9994162853
Army of Mississippi's Medical Department Apr-Jul 1862	PA Ussery	U MS Press, 1981
Armed Progressive: A Study of the Military and Public Career of Leonard Wood	JC Lane	0891410090
Art of the Warrior	RD Sawyer, Sun Pin	1570621632
Assault at Mogadishu	K Hermann, P Koch	0552107743
Asymmetrical Warfare on the Great Plains, A Review of the American Indian Wars - 1865-1891	LS Yarbrough	AWC 2002
At the Hurricane's Eye	G Walker	0804109559
Badges and Insignia of the Elite Forces	L Thompson	1854095110
Battle Exhaustion: Soldiers and Psychiatrists in the Canadian Army, 1939-1945	TT Copp, B McAndrew	0773507744
Behind Fascist Lines	AK Starinov	0345444574
Behind Japanese Lines: An American Guerrilla in the Philippines	RC Hunt, B Norling	0813109868
Belle Boyd: Siren of the South	R Scarborough	0865545553
Beret Insignia of the U.S. Army	WA Hudspeath, RW Smith	B000714ZSK
Black Hawk Down: A Story of Modern War	M Bowden	0871137380
Blank Check	T Weiner	0446514527
Bravo Two Zero	A McNab	059303421X
Cambodia: Analysis of U.S. Military Assistance	KR Bowra	ACGSC 1983
Casebook on Insurgency and Revolutionary Warfare	PA Jureidini, et al.	SORO, 1962
Casualties & Consensus: The Historical Role of Casualties in Domestic Support for U.S. Military Operations	EV Larson	0833023705
Central Burma: The United States Army Campaigns of World War 2	GL Macgarrigle	0160481376
Champ Ferguson. Confederate Guerilla	T Sensing	0826512127
Chimborazo: The Confederacy's Largest Hospital	CC Green	1572333162
Civil War Medicine	SM Brooks	B0007DN1N8
Civil War Medicine 1861-1865	CK Wilbur	0791052079
Civil War Medicine: Care & Comfort of the Wounded	RE Denney	0806908793
Civil War Medicine: Challenges and Triumphs	AJ Bollet	1883620082
Civil War Nurse: The Diary and Letters of Hannah Ropes	HA Ropes, JR Brumgardt	0870492802
Civil War Pharmacy: A History of Drugs, Drug Supply and Provision, and Therapeutics for the Union and Confederacy	MA Flannery	0789015021
Civil War Schemes and Plots	WB Garrison	0517162873
Classics of Strategy and Counsel, Volume 1	TF Cleary	1570627274
Code-Name Bright Light: The Untold Story of U.S. POW Rescue Efforts During the Vietnam War	GJ Veith	0440226503

Title	Author	ISBN
Code Name Copperhead	JR Garner, AM Fine	671864351
Cohesion, the Key to Special Operations Teamwork	RE McDonald	B00010X2WC
Cold Injury, Ground Type	TF Whayne	00071O36E
Combat Surgeons	J Laffin	0750921730
Combined Operations	L Mountbatten, H Saunders	417987413
Command and Control	JD Mitchell	0425117774
Commando Raids: 1946-1983	B Hoffman	B0006EQN60
Commandoes	DC Waller	0671787179
Commandos and Rangers of World War II	JD Ladd	0312151675
Commandos from the Sea: Soviet Naval Spetsnaz in World War II	YF Strekhnin, JF Gebhardt	1557508321
Come Retribution: The Confederate Secret Service and the Assassination of Lincoln	WA Tidwell, et. al.	0878053484
Complete Art of War	Sun Pin, et. al.	0813330858
Conduct of the Partisan War in the Revolutionary War South	KE Jacobsen	CGSC 2003
Confederate Agent, a Discovery in History	JD Horan	B0007EW656
Confederate Commando and Fleet Surgeon	JW Lynn, DB Conrad	1572492201
Confederate Courage on Other Fields: Four Lesser Known Accounts of the War Between the States	MJ Crawford	786407204
Confederate Hospitals on the Move: Samuel H. Stout and the Army of Tennessee	GR Schroeder-Lein	0872499642
Confederate Spy	LA Sigaud, B Boyd	B0007EDK7E
Confederate States Medical and Surgical Journal	SP Moore, WD Sharpe	0810809729
Confederate Surgeon: Aristides Monteiro	S Dannett, RH Burkart	0396058965
Confederate Surgeon: The Personal Recollections of E.A. Craighill	EA Craighill, PW Houck	0930919912
Confederate Operations in Canada and New York	JW Headley	0809442841
Countering the New Terrorism	IO Lesser, et. al.	0833026674
Counterinsurgency Lessons from Malaya and Vietnam: Learning to Eat Soup with a Knife	JA Nagl	0275976955
Coup d'Etat	E Luttwak	0674175476
Crippled Eagle: A Historical Perspective	R Lenahan	1886391238
Cushing: Civil War SEAL	RJ Schneller	1574886967
Dark Lanterns: Secret Political Societies, Conspiracies and Treason Trials in the Civil War	FL Klement	0807115673
Darkmoon: Eighth Army Special Operations in the Korean War	E Evanhoe	1557502463
Debris of Battle	GA Patterson	081170498X
Delta: America's Elite Counterterrorist Force	T Griswold, DM Giangreco	0879386150
Delta Force	CA Beckwith, D Knox	0151246572
Desperate Deception: British Covert Operations in the United States, 1939-44	TE Mahl, R Godson	1574880802
Deterrence and Influence in Counterterrorism: A Component in the War on Al Qaeda	PK Davis, BM Jenkins	0833032860
Diary of Dr. J. F. Shaffner, Sr: Commencing September 13, 1863, ending February 5, 1865	JF Shaffner	B00086U8U8
Disease and History	FF Cartwright	0880296909
Doctor to the Front: The Recollections of Confederate Surgeon Thomas Fanning Wood, 1861-1865	TF Wood, DB Koonce	1572330821
Doctors in Blue	GW Adams, H Schuman	0890290865
Doctors in Gray	HH Cunningham	0844605662
Dr. J. G. M. Ramsey: Autobiography and Letters	JG Ramsey, et. al.	1572331739
Dr. Mudd and the Lincoln Assassination: The Case Reopened	JP Jones	0938289500
Ducimus. The Regiments of the Canadian Infantry	M Mitchell	CA War Mus., 1992
Early Texas Physicians 1830-1915	RM Hood, TR Fehrenbach	1880510634

Title	Author	ISBN
Edward Lansdale: The Unquiet American	CB Currey	1574881760
Elite Warriors: 300 Years of America's Best Fighting Troops	LQ Zedric, MF Dilley	0934793603
Elusive Victory: The Arab-Israeli Wars, 1947-1974	TN Dupuy	0840378629
Encyclopedia of Guerrilla Warfare	IFW Beckett	0874369290
Eyes of the Hammer	B Mayer	0312928629
Euphemia Mary Goldsborough, 1836-1896, Exile to Sweet Dixie: The Story of Euphemia Goldsborough, Confederate Nurse and Smuggler	EF Conklin, EM Goldsborough	1577470443
Faded Coat of Blue	O Parry	0380797399
Farmcarts to Fords: A History of the Military Ambulance	JS Haller	0809318172
Field Medical Services at the Battles of Manassas	HH Cunningham	0935523170
Field Surgeon at Gettysburg	CB Kernek	1878208322
Fighting Elite	I Padden	0553253581
Fighting for Life	AE Cowdrey	0029068355
Fighting in the Streets: A Manual of Urban Guerilla Warfare	Urbano	094263747X
Foreign Internal Defense Does Air Force Special Operations Have What it Takes?	MC Koster	B00010X5QU
Foundation for Victory: Operations and Intelligence Harmoniously Combine in Jackson's Shenandoah Valley Campaign (1862)	SB Smith	NPS, 1993
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The Propensity of Things: Toward a History of Efficacy in China	F Jullien, J Lloyd	0942299949
The Shadow Warriors: O.S.S. and the Origins of the C.I.A.	BF Smith	0233975772
The Shining Path: A History of the Millenarian War in Peru	GG Ellenbogen, G Gorriti	0807846767
The Withered Vine	CR Shrader	0275965449
The Women Who Lived for Danger	M Binney	0060540877
The Zapatista Social Netwar in Mexico	D Ronfeldt, et. al.	0833026569
Theoretical Perspectives of Terrorist Enemies as Networks	RG Spulak	
They Fought Alone	J Keats	B0006AYKWI
Tito's Partisans 1941-45	V Vuksic	1841766755
U.S. Special Operations Forces in the Cold War	L Thompson	1853675067
United States Army and World War 2: Selected Papers From the Army's Commemorative Conferences	JL Bellafaire	016049589X
War of the Flea: Classic Study of Guerrilla Warfare	R Taber, BE O'Neill	1574885553
War Stories of the Green Berets	H Halberstadt	076031974X
Warfare in the Far North	W Erfurth	00075X6
Witness to War: An American Doctor in El Salvador	C Clements	0553050648

REFERENCE

1. Farr WD. Book List. *Journal of Special Operations Medicine*, 2005: Winter 2006 6(1): 88-98.

The following is a compiled list of SOF related books recommended for your reading by those who were there. This list is complements of Len Blessing. If anyone has other books they would like to add to the list, let us know. The intent is to present a concise list of the vast array of reading material available that pertains to the mission of Special Operations - both past and present.

Every attempt is made to maintain the list's integrity with respected and legitimate works. I have removed the books that duplicated COL Farr's list.

Readers who feel a selection does not merit inclusion are encouraged to contact us with disputes. We also strongly encourage readers to write a short review for the books they have read and/or have personal first hand knowledge concerning a specific selection. This will help maintain a high degree of content validity.

Title	**Author**
00:19:57	Dave F Stafford
A Tear For Somalia (Written by a Brit who married a Somali woman while serving as a member of the British Camel Corps after the end of WWII. Not a history, but it does give insight into Somali society.)	Douglas T Collins
A Very Short War (About the last gunfight and the last sacrifices of the Vietnam-era war in the recovery of the crew and ship SS Mayaguez in 1975.)	John F Guilmartin Jr
Advice and Support: The Early Years	Ronald H Spector
Airborne and "Special Forces" (non-fiction, good quick references, especially for family or civilians)	Hans Halberstadt
American Guerrilla (WW II U.S. led guerrillas in Phillipines)	Unknown
Band of Brothers (A great story about "E" Company, 506th PIR, 101st ABN Division in WWII.)	Stephen Ambrose
Battle for the Central Highlands: A Special Forces Story	George E Dooley
Beyond Nam Dong	Roger Donlon
Black Eagles (Fiction)	Larry Collins
Blackburns Headhunters (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	COL Donald Blackburn
Blackjack -33: With Special Forces in the Viet Cong Forbidden Zone	James C Donahue
Blackjack -34 (Previously titled "No Greater Love")	James C Donahue
Break Contact Continue Mission (Fiction)	Raymond D Harris
Bunard: Diary of a Green Beret	Larry Crile
Che Guevarra on Guerrilla Warfare	Ernesto Gueverra
Covert Warrior	Warner Smith
Danger Close (Non-fiction. SF member charged with murder in a bar fight within 3 days of graduation from the Q Course.)	Mike Yon
Fighting Men: Stories of Soldiering	Jim Morris
Fire Your FPL's	Mike Di Rocco
Five Fingers	Gayle Rivers
Five Years To Freedom	James N Rowe
Flags of our Fathers	James Bradley & Ron Powers
Foreign Devils on the Silk Road (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	Peter Hopkirk
Greatest Rescue Mission (Ranger operation to free POWs in the Philippines)	
Green Berets at War: U.S. Army Special Forces in Asia 1956-1975	Shelby L Stanton

Title	Author
Green Berets in the Vanguard: Inside Special Forces 1953-1963	Chalmers Archer Jr
Guerrilla Warfare: On Guerrilla Warfare	Mao Tse tung
Hazardous Duty	David H Hackworth (COL) & Tom Mathews
Hell In A Very Small Place (Siege of Dien Bien Phu)	Bernard Fall
Ho Chi Minh: A Life	William J Durker
In The Village of the Man	Loyd Little
Inside Al Qaeda, Global Network of Terror	Rohan Gunaratna
Inside Delta Force: The story of America's elite counterterrorist unit	Eric L Haney
Inside the Green Berets: The First Thirty Years	Charles M Simpson III
It Doesn't Take A Hero	Norman H Schwarzkopf (GEN Ret) & Peter Petre
Laos: War and Revolution	Nina S Adams (Ed)
Like Hidden Fire (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	Peter Hopkirk
Logistical Support of Special Operations Forces During Operations Desert Shield and Desert Storm	Donald W Betts
Long Shadows (Fiction)	Kent White
Lost Crusader: The Secret Wars of CIA Director William Colby	John Prados
Love and Duty	Ben & Anne Purcell
Medal Of Honor	Roy P Benavidez
Memories Of Maggie: Martha Raye: A Legend Spanning Three Wars	Noonie Fortin
My American Journey	Colin Powell (GEN Ret) & Joseph E Persico
My Secret War	Richard S Drury
Night Jungle Operations	Thomas B Bennett
Night of the Silver Starts: The Battle of Lang Vei	William R Phillips
No Surrender (Japanese soldier who evaded capture and survived 30 years in the Philippines; it's a great book about perseverance and commitment to warrior ideals.)	Hiroo Onoda
Once A Warrior King: Memories of an Officer in Vietnam	David Donovan
O O T W Target Cuba	Robin Moore & JC Lamb
Operation Vulture	John Prados
OSS to Green Berets	Aaron Bank (COL Ret)
Parthian Shot	Loyd Little
Pathfinder: First In, Last Out (A very well written account of Richie Burns' first tour in RVN, during which he provided support to a Mike Force mission, and which describes other activities very similar to SF missions during the war.)	Richard C Burns
Peoples' War, Peoples' Army	Vo Nguyen Giap
Perilous Options: Special Operations as an Instrument of U.S. Foreign Policy	Lucien S Vandenbroucke
Phantom Warriors, Book II	Gary A Linderer
Phantom Warriors: LRRPs, LRPs, and Rangers in Vietnam, Book I	Gary A Linderer
Presidents' Secret Wars: CIA and Pentagon Covert Operations from World War II Through the Persian Gulf	John Prados
Rangers at War: Combat Recon in Vietnam	Shelby L Stanton
Rescue Of River City	Drew Dix
Return of The Enola Gay	Paul W Tibbets
Return With Honor	Scott O'Grady (Capt) & Jeff Coplon

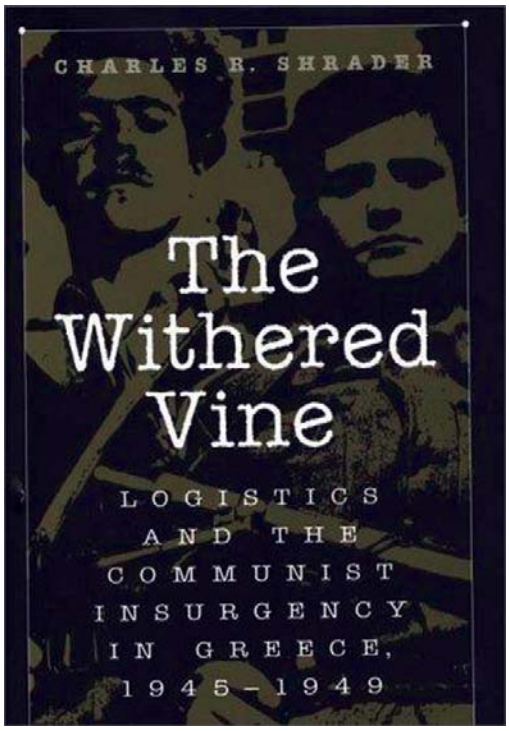
Title	Author
Setting the East Ablaze (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	Peter Hopkirk
Seven Pillars of Wisdon (Middle East insight)	TE Lawrence
SF Bibliography: Collection of articles and other readings with Special Forces topics	Radix Press/Dan Godbee
Shadow War: Special Operations and Low Intensity Conflict	HT Hayden
Silent Birdmen (281st AHC pilot account; Project Delta Ops in Ashau Valley.)	Al Rampone
Slow Walk In A Sad Rain	John P McAfee
SOG and SOG Photo Book	John Plaster
SOG: Volume I, II, III and IV	Harve Saal
SPEC OPS: Case Studies in Special Operations Warfare: Theory and Practice	William H McRaven
Special Forces 1941-1987	LeRoy Thompson
Special Forces, the U.S. Army's experts in Unconventional Warfare	Caroll B Colby
Special Men and Special Missions: Inside American Special Operations Forces, 1945 to the Present	Joel Nadel & JR Wright
Spies And Commandos	Kenneth Conboy
Stolen Valor	B G Burkett & Glenna Whitley
Strategy and Policy Background Umbrella Concept for Low Intensity Conflict	Alex & Hamilton Booz
Street Without Joy (French in Indochina; Good groundwork for SF in Vietnam)	Bernard B Fall
Taking The High Ground: Military Moments With GOD	Jeff O'Leary (Col)
Talking with Victor Charlie: An Interrogator's Story	Sedgwick D Tourison Jr
Tam Phu	Leigh Wade
The Barking Deer (Fiction)	Jonathan Rubin
The Blood Road: The Ho Chi Minh Trail and the Vietnam War	John Prados
The Chindit War (Good section on Merrill's Marauders)	Shelford Bidwell
The Devil's Guard (A non-SF book; a good read and supposedly historically accurate. Covers the war from the viewpoint of the ex-Nazi's who were in the French Foreign Legion fighting the Viet Minh.)	George R Elford
The Dying Place (Fiction)	David A Maurer
The Great Game (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	Peter Hopkirk
The Green Berets in Vietnam, 1961-71	Francis J Kelly
The Hidden History of the Vietnam War	John Prados
The Last Confucian	Denis Warner
The Making of a Quagmire	David Halberstam
The Montagnards of South Vietnam	Robert L Mole
The New Legions	Donald Duncan
The Politics of Heroin in SE Asia (Essential reference for understanding the Golden Triangle.)	Alfred McCoy
The Price of Exit (Helicopter pilot, Lam Son 719 and CCN)	Tom Marshall
The Raid	Benjamin F Schemmer
The Ravens (The classic about our Bird Dog brothers)	Christopher Robbins

Title	Author
The Rescue of Bat-21	Darrel D Whitcomb
The Road to Arnhem: A Screaming Eagle in Holland	Donald R Burgett
The Secret Wars: A Guide to Sources in English, Volume II, Intelligence, Propaganda and Psychological Warfare, Covert Operations, 1945-1980	Myron J Smith
The Sorrow of War: A Novel of North Vietnam (This is a work of fiction with many facts written by a NVA Officer.)	Bao Ninh
Tiger the Lurp Dog (Fiction)	Kenneth Miller
Tragedy in Paradise: A Country Doctor at War in Laos	Charles Weldon, MD
Trespassers on the Roof of the World (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	Peter Hopkirk
Umbrella Concept for Low Intensity Conflict	Alex & Hamilton Booz
Unconventional Operations Forces of Special Operations	Mark D Boyatt
Uneasy Warrior	Vincent Coppola
U.S. Army Special Forces 1952-84	Gordon L Rottman
U.S. Army Handbook for North Vietnam Dept. of Army: 550-57	
U.S. Army Handbook for Cambodia Dept. of Army: DA Pam: 550-50	
U.S. Army Handbook for Laos Dept. of Army: DA Pam: 550-58	
U.S. Army Handbook for South Vietnam Dept. of Army: DA Pam: 550-55	
U.S. Army Handbook: Minority Groups in the Republic of Vietnam: Ethnographic Series Dept. of Army:DA Pam: 550-105	
U.S. Army Special Operations in World War II	David W Hogan Jr
U.S. Special Forces	Peter McDonald
Urgent Fury: The Battle for Grenada	Mark Adkin
Valley of Decision: The Siege of Khe Sanh	John Prados
Vietnam Above The Tree Tops: A Forward Air Controller Reports	John F Flanagan
Vietnam in American Literature	Philip H Melling
Vietnam Military Lore: Legends, Shadow and Heroes	Ray E Bows (MSG Ret)
Vietnam Order of Battle: A Complete, Illustrated Reference to the U.S. Army and Allied Ground Forces in Vietnam, 1961 - 1973	Shelby Stanton
Vietnam Studies: Command and Control 1950-1969	Maj Gen George Eckhardt
Vietnam: A History	Stanley Karnow
Vietnam: The Origins of Revolution	John T McAlister Jr
Vietnam: The Secret War	Kevin M Generous
War Stories of the Green Berets: The Vietnam Experience	Hans Halberstadt
War Story	Jim Morris
We Were Soldiers Once And Young	Harold G Moore (LTG) & Joseph L Galloway

Book Review

Shrader, Charles R. *The Withered Vine: Logistics and the Communist Insurgency in Greece,* 1945-1949. Praeger Publishers: Westport: Connecticut. 1999. ISBN: 0275965449.
Reviewed by: Colonel Rocky Farr

It is said that guerrillas only write histories if they win and then they only write about battles. Charles Shrader has found the hidden writings of the combat service support and combat health support operations of the Greek guerrillas of World War II and shortly after. This was the first attempted post-war communist war of national liberation and was strongly opposed by the west with support to the Greek government. This civil war of 1945-1949 was dramatically influenced by both Greece's harsh physical environment and its turbulent political history. Shrader provides a detailed examination of the logistical, and to some degree medical, aspects of the war, particularly the impact of political decisions and the aid provided to the Greek Communists by outside supporters on logistics, medicine, and operations. The Greek Democratic Army General Headquarters had a medical directorate and a chief surgeon. The guerrilla medical service was well organized with a structure on the table of organization, with two "Stretcher Bearer Battalions" and field hospitals in secure locations -- one of eighty beds. They also had a veterinary hospital in Bulgaria! They primarily relied on cross- border hospitals in Yugoslavia, Romania, Albania, and Bulgaria. The aid in the form of medical supplies, training, personnel, and evacuation to cross-border hospitalization in safe havens, is detailed, as is the results of it later being cut off. Bulgarian Red Cross ambulance aircraft were used to evacuate some cases. This book gives a striking lesson in what happens to a guerrilla forces when it lacks adequate manpower and logistical resources, and is divided against itself on such basic matters as foreign policy and the employment of its military capabilities. It is well researched, well documented, with excellent casualty statistics, several good maps with hospital locations, and is the first English language study of the support side of this unconventional conflict. It also provides essential historical background on the Greek civil war and its origins in the Greek resistance effort during World War II. It shows the effect of relying on cross border medicine and on what happens when such support is withdrawn.

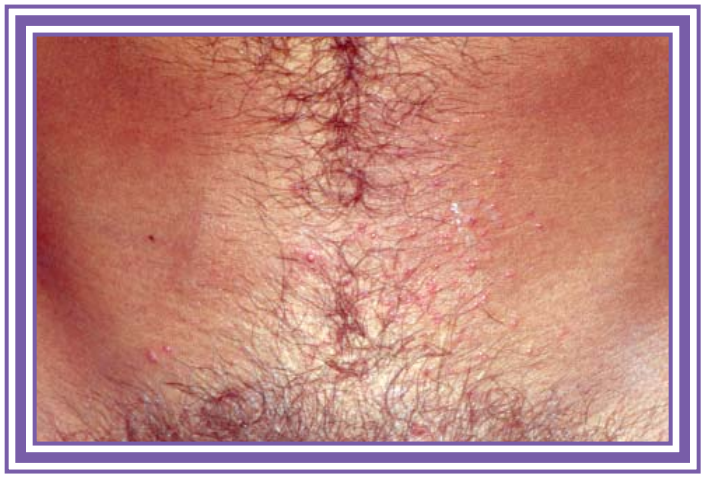


Med Quiz

Picture This….

Patrick M. Ellison, MD

A 22-year-old Soldier on deployment presents complaining of multiple firm, slightly itchy "bumps" on his penis, scrotum, and lower abdomen. His last reported sexual encounter was 3 months ago while on his mid-tour leave with an old girlfriend from his hometown. The lesions pictured below have been present on the lower abdomen and pubic area for two months and seem to be multiplying.



Genital and cutaneous molluscum lesions

Question 1:
Using the primary lesion definitions outlined in your SOF medical handbook, how would you describe the morphology of this lesion?

Question 2:
What is your differential diagnosis?

Answers

Question 1:

Morphology: The symmetric "bump" of interest is a 3 millimeter wide, smooth surfaced, dome shaped, flesh colored to pink papule with a central umbilication.

Question 2:

Your differential diagnosis should include molluscum contagiosum, condyloma accuminatum, papular granuloma annulare, lichen planus, pearly penile papules, and herpes simplex. An inflamed solitary lesion can also resemble a furuncle or a pyogenic granuloma.

MOLLUSCUM CONTAGIOSUM:

Epidemiology

Molluscum contagiosum (MC) is a virus found throughout the world and affects all races equally. This viral infection commonly affects children, sexually active adults, and individuals with a compromised immune system. The prevalence of the disease in children is higher in tropical, warm, humid climates and infection typically occurs by fomite transmission associated with sharing towels, baths, or gymnasium equipment.[1,2] Lesions in adolescents and adults tend to occur in a genital distribution and are most often sexually transmitted. The incidence of MC in the United States has been increasing since the 1960s with the largest increases observed in sexually active patients aged 20 to 29 years.[3] When the lesions are widely disseminated and/or are extremely large, the possibility of concomitant HIV infection should be considered.[4]

Etiology/Pathogenesis

Molluscum contagiosum is a DNA based poxvirus that infects the epidermis of the skin and mucosal surfaces.[5] The virus causes the skin cells to replicate more rapidly, thereby causing the raised dome shaped papule at the skin surface. Viral particles are expressed in a white, thick, pasty discharge expressed from the central umbilication. Exposure to water is thought to enhance viral particle release and areas of altered barrier function such as eczema or sites of minor trauma are more prone to becoming infected.[6] Skin manifestations of the disease usually appear following a two to seven week incubation period; however, lesions have developed up to six months after initial contact to the virus.[7]

Clinical

Molluscum contagiosum is considered a sexually transmitted disease when it occurs in adults. The lesions are typically asymptomatic and appear as smooth surfaced, dome shaped papules with central umbilication. They may demonstrate variability in size, ranging from 2mm to 6mm in diameter, and in coloration from flesh or pink colored to white, yellow, or translucent in appearance. Lesions typically number from 1 to 20 are often isolated but can also be found in a grouped or confluent arrangement and appear as a larger plaque. On close inspection these larger plaques are often studded with multiple discrete invanginations that correlate with the punctum of the coalesced molluscum papules. This can be accentuated by lightly freezing a lesion, which causes the umbilication to appear as a small clear indentation on a white background.[2] Lesions can become irritated and may cause pruritus, tenderness, or pain. Scratching or picking at lesions may result in spread to other locations or secondary bacterial infection and may resemble a furuncle or abscess.[2] Shaving over the lesions results in local dissemination as the viral particles are deposited into adjacent, moist, and slightly compromised cutaneous surfaces. In some instances shaving has caused a viral induced folliculitis that manifests with follicular based erythema, pustules, and irritation.[8]

In women the lesions tend to be distributed on the vulva, inner thighs, buttocks, and perianal region. In men, lesions are most often seen primarily on the penis, perineum, and scrotum. Cutaneous surfaces covered by pubic hair or within skin folds typically harbor less visible lesions and should be inspected carefully. The eyelids are another common location and may mimic a stye or manifest as persistent conjunctivitis on clinical examination.[9]

Diagnosis

In most cases the diagnosis can be reliably made based on the clinical appearance of the lesions. Confirmation may be obtained from a shave biopsy or by examination of a smear prepared from the pasty white material expressed from the core of an individual lesion. Polymerase chain reaction (PCR) can be used to detect the virus particles from skin scrapings and biopsies, although this technique is not usually readily available at smaller laboratory facilities.[10]

To perform a shave biopsy, a local anesthetic is infiltrated into the skin creating a wheal that elevates the lesion and blanches about 1 millimeter of normal skin around the lesion. A number 15 scalpel blade or a single edged flexible razor blade may be used for removing the lesion. The specimen is best removed flush with the surrounding skin and hemostasis can be achieved with pressure, electrocoagulation, or application of a cotton tipped applicator dipped in a solution of aluminum hydroxide. The specimen should be placed in a container filled with formalin and submitted to a laboratory for histopathological review. A dressing consisting of petrolatum and a small bandage can be used in conjunction with daily cleaning until the wound heals by secondary intention.

A smear can be prepared by expressing the pasty core of a lesion with a comedoextractor, paperclip, or by curettage. The white material is then mashed between two slides and stained with Gram, Wright, or Geimsa stains.[2] Submission to a laboratory for further evaluation is recommended and examination should take place shortly after preparation of the smear. Evidence of molluscum bodies or inclusions within the skin cells is diagnostic.

In adults and adolescents the diagnosis of MC is considered a sexually transmitted disease. A patient that presents with this diagnosis in this age group should be evaluated for the possibility of other sexually transmitted diseases to include gonorrhea, syphilis, chlamydia, genital/vaginal condyloma, and human immunodeficiency virus.[2]

Treatment

Molluscum contagiousum is a self-limited disease and most lesions resolve as the immune system recognizes and responds to the viral infection. This unfortunately can take weeks to months for a given lesion to resolve and possibly years for all lesions to clear. Intervention is typically done to prevent further autoinoculation and spread to others, and should be strongly considered if lesions are painful, pruritic, secondarily infected, or involve the genital region. Genital lesions should be treated to reduce the risk of sexual transmission and to prevent autoinoculation to other parts of the body. A wide variety of treatment modalities are available and include both surgical and medical interventions.

Curettage of individual lesions is highly effective and gives the patient immediate results. Care should be taken to remove only the dome shaped papule flush with the surrounding normal skin. Ensure that the entire creamy-white paste in the center of the lesion is completely removed, as the paste is what harbors the highest concentration of the virus and can perpetuate the infection. Application of a local anesthetic such as lidocaine with prilocaine (EMLA) for 30 minutes to an hour before treatment helps reduce discomfort. Treatment can cause scarring and in patients with pigmented skin may cause hyper or hypo-pigmentation.

Cryotherapy using liquid nitrogen on a cotton-tipped applicator is another helpful destructive modality. Individual lesions are "frozen" for 15 seconds by placing the cotton tipped applicator directly onto the lesion. This technique can result in scarring and dyspigmentation as well.

Topical medications applied by the patient are helpful and provide additional alternatives for treatment. Tretinoin 0.025% to 0.1% cream or gel is commonly used in the treatment of acne and is also known as Retin A. It is applied to individual lesions once daily and acts by inciting a local inflammatory reaction. This agent should be used very cautiously in the genital region because it can cause significant irritation.[2] Podofilox 0.5% gel is often used in the treatment of genital warts and may hasten the clearance of molluscum lesions. It is typically applied three times a week on consecutive days with a four-day rest between treatment applications. This is continued until lesions resolve. Imiquomod 5% cream is a topical treatment that stimulates a local immune response at the site of application by locally increasing inflammatory cytokines and interferon alpha in particular. Medication is applied to individual lesions once daily, five days per week, for 4 to 16 weeks.[11] Patients should expect mild erythema, pruritus, and, in some cases, erosions at sites of application.

Patient counseling is an important and all too often overlooked component in treating molloscum contagiosum. Although this is a benign infection and often heals spontaneously, it can be sexually transmitted. Patients should be counseled that the occurrence of genital molloscum might indicate the presence of other sexually transmitted diseases and appropriate screening is indicated. In addition, latex condoms may help prevent transmission, but patients should be reminded that viral transmission can occur via any skin-to-skin contact to include areas affected but not covered by a condom.[12]

If you are deployed and have a concern about a puzzling skin lesion, email your clinical photos and, with the aid of your SOF manual, a concise morphologic description of the lesion to the Operational Teledermatology site at derm.consult@ us.army.mil or to the editor of "Picture This" directly at Daniel.Schissel@us.army.mil. The lesion you describe just may make its way to the next edition of **Picture This…**

Thanks for all you do.

Photos Courtesy of LTC Joe Wilde USA MC

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2. James WD, Berger TG, Elston DM. Andrews' diseases of the skin clinical dermatology 10/ed WB Saunders and Elsevier Inc. 2006; 394-397
3. Becker TM, Blount JH, Douglas J, Judson FN. Trends in molluscum contagiosum in the United States, 1966-1983. *Sexually Transmitted Diseases*. 1986 Apr-Jun; 13(2):88-92.
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Capt Patrick M. Ellison is a 2000 graduate of the Uniformed Services University of the Health Sciences. He completed his internship at Travis AFB, David Grant Medical Center in 2001. He then served as a flight surgeon with the 99th Reconnaissance Squadron at Beale AFB in support of U-2 flight operations. During his tenure as a flight surgeon, Dr. Ellison deployed in support many operational missions to include Operations Southern Watch, Enduring Freedom, and Iraqi Freedom. He is currently finishing his dermatology residency at Brooke Army and Wilford Hall Medical Centers.

LTC Daniel Schissel originated "Picture This" for the MED Quiz. He is a 1993 graduate of the Uniformed Service University of the Health Sciences and completed his internship with the family practice department at Fort Bragg in 1994. He then served as the 2/10th Special Forces Group (Airborne) surgeon and followed on as the 10th SFG(A) Group Surgeon. He completed his residency training in dermatology at the Brooke Army Medical Center in 1999. LTC Schissel is presently station in Heidelberg, Germany as a staff physician and the European Regional Medical Command Dermatology Consultant. He has authored the dermatology section of the new SOF manual, serves on the USSOCOM Medical Curriculum and Examinations Board, and is the U.S. Army Aviation Dermatology Consultant.

Dedication

Sergeant First Class Richard J. Herrema

SGT 1st Class Richard J. Herrema was killed in combat during operations April 25, 2006, in Iraq against known enemies of the United States of America.

He was born March 28, 1979, in Grand Rapids, MI, and graduated from Unity Christian High School in Hudsonville, MI.

He first entered the U.S. Army as an infantryman on Jan. 11, 1999. After completion of initial Basic Entry Training, he was assigned to B Company, 3rd Battalion, 327th Infantry Brigade, 101st Airborne Division (Air Assault), Fort Campbell, KY, and then as a Squad Leader in Headquarters and Headquarters Company, 3rd Battalion, 327th Infantry Brigade, 101st Airborne Division (Air Assault), Fort Campbell. He graduated from the Special Forces Qualification Course in June 2003 as an 18D SF Medical Sergeant and was assigned as an instructor in G Company, 1st Battalion, 1st Special Warfare Training Group (Airborne) at Fort Bragg, N.C. His last assignment was as a team member assigned to the U.S. Army Special Operations Command, Fort Bragg, NC.

In addition to the Special Forces Qualification Course, he completed numerous military courses including the Air Assault Course; the Combat Lifesaver Course; the Ranger Course; the Basic Airborne Course; the Special Operations Medical Sergeant Course; the Basic Noncommissioned Officer Course; the Survival, Evasion, Resistance, and Escape Course; and the Military Freefall Course.

His awards and decorations include two Army Commendation Medals, five Army Achievement Medals, two Army Good Conduct Medals, the National Defense Service Medal, the Iraq Campaign Medal, the Global War on Terrorism Service Medal, the Humanitarian Service Medal, the Noncommissioned Officer Professional Development Ribbon with numeral two, and the Army Service Ribbon. During his career he had also earned the Military Freefall Parachutist Badge, the Parachutist Badge, the Air Assault Badge, and both the Special Forces and Ranger Tabs.

Herrema was posthumously promoted to SGT 1st Class. He was also posthumously awarded a Bronze Star Medal for valor, the Defense Meritorious Service Medal, the Purple Heart, and the Combat Infantryman Badge.

He is survived by his parents and two sisters.

In keeping with our primary focus on SOF Combat medical personnel, we have always dedicated the JSOM to one of our SOF combat medical providers who has fallen in battle, usually while taking care of his wounded teammates.

In this issue we continue that tradition, but we want also to remember all of our SOF medical personnel who have been wounded in battle. Our SOF Warrior Medics typically work under the most difficult circumstances imaginable, often exposing themselves to intense hostile fire in the performance of their lifesaving duties. Let us all take a moment to give thanks for these survivors, thanks that our country has courageous, dedicated men such as these to accompany our SOF units into battle, and thanks for all of our SOF medical personnel who have survived their wounds and lived to come home to their loved ones and continue caring for their SOF teammates wounded in the Global War on Terror.

Journal of Special Operations Medicine

1. Use the active voice when possible. This is our most common editorial problem and often requires extensive re-writes. An example of the active voice is, "An 'action guy' uses the active voice whenever possible." An example of the undesired passive voice is, "The passive voice is used by boring authors whenever possible." In other words, use the sequence "subject - verb - object."
2. Secure permission before including names of personnel mentioned in your piece. Do not violate copyright laws. If the work has been published before, include that information with your submission.
3. Format articles to be single-spaced, eleven point font, aligned on the left, and justified on the right.
4. **Important:** Include an abstract, biography, and headshot photo of yourself as part of the article. Also include three learning objectives and ten test questions to be used for continuing education purposes.
5. Use a minimum of acronyms; spell out all acronyms when first used.
6. Remember that your audience is inter-service, civilian, and international.
7. Put the point of the article in the introductory paragraph and restate it in the closing or summary. Subtlety is not usually a virtue in a medical publication.
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14. **All articles written by USSOCOM members must be reviewed and pre-approved by your component surgeon and PAO prior to submission to the JSOM.**
15. Remember, the JSOM is your journal and serves as a unique opportunity for you to pass your legacy to the SOF medical community.

Take advantage of the opportunity

Special Forces Aidman's Pledge

As a Special Forces Aidman of the United States Army, I pledge my honor and my conscience to the service of my country and the art of medicine. I recognize the responsibility which may be placed upon me for the health, and even lives, of others. I confess the limitation of my skill and knowledge in the caring for the sick and injured. I promise to follow the maxim "Primum non- nocere" ("First, thou shalt do no harm"), and to seek the assistance of more competent medical authority whenever it is available. These confidences which come to me in my attendance on the sick, I will treat as secret. I recognize my responsibility to impart to others who seek the service of medicine such knowledge of its art and practice as I possess, and I resolve to continue to improve my capability to this purpose. As an American soldier, I have determined ultimately to place above all considerations of self the mission of my team and the cause of my nation.

Pararescue Creed

I was that which others did not want to be. I went where others feared to go, and did what others failed to do. I asked nothing from those who gave nothing, And reluctantly accepted the thought of eternal lonliess ....should I fail. I have seen the face of terror; felt the stinging cold of fear, and enjoyed the sweet taste of a moment's love. I have cried, pained and hoped...but most of all, I have lived times others would say best forgotten. Always I will be able to say, that I was proud of what I was: a PJ It is my duty as a Pararescueman to save a life and to aid the injured. I will perform my assigned duties quickly and efficiently, placing these duties before personal desires and comforts.

These things I do,
"That Others May Live."

A Navy Poem

I'm the one called "Doc"...I shall not walk in your footsteps, but I will walk by your side.I shall not walk in your image, I've earned my own title of pride. We've answered the call together, on sea and foreign land. When the cry for help was given, I've been there right at hand. Whether I am on the ocean or in the jungle wearing greens, Giving aid to my fellow man, be it Sailors or Marines. So the next time you see a Corpsman and you think of calling him "squid", think of the job he's doing as those before him did. And if you ever have to go out there and your life is on the block, Look at the one right next to you...

I'm the one called "Doc".

~ Harry D. Penny, Jr. USN

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